TC-366-4

E Model

SPECIFICATIONS

Power Requirements: AC 100, 110, 117, 125, 220, 240 V, 40W, 50/60 Hz

Track System: Four-track, four-channel stereo

Reel Size: 7" maximum

Tape Speed: 7½ ips and 3¾ ips (19 cm/s and 9.5 cm/s)

Recording Time: (with 1,800 ft tape)

Tape speed	4-channel stereo	2-channel stereo
7½ ips (19 cm/s)	45 min.	1.5 hrs
3¾ ips (9.5 cm/s)	1.5 hrs	3 hrs

Frequency Response: 20~25,000 Hz at 7½ ips (19 cm/s)
30~17,000 Hz at 3¾ ips (9.5 cm/s)

Signal-to-Noise Ratio: Normal 52 dB, Special 55 dB

Flutter and Wow: 0.09% at 7½ ips (19 cm/s)
0.12% at 3¾ ips (9.5 cm/s)

Recording Bias Frequency: Approx. 125 kHz

Inputs: Four MIC inputs
Impedance: 600Ω
Maximum sensitivity: 0.19 mV (-72 dB)
Four AUX INputs
Impedance: 100 kΩ
Maximum sensitivity: 0.06 V (-22 dB)

Outputs: Four LINE OUTputs
Impedance: 100 kΩ
Output level: 0.775 V (0 dB)
Two HEADPHONE outputs
Impedance: 8Ω
Output level: 30 mV (-28 dB)

Semiconductors: 49 transistors and 6 diodes

Dimensions: $16\frac{31}{32}$ (W) x $18\frac{25}{32}$ (H) x $9\frac{39}{64}$" (D)
(431 x 477 x 244 mm)

Weight: 28 lb 3 oz (12.8 kg)

SONY®

SERVICE MANUAL

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1. GENERAL DESCRIPTION

The SONY Model TC-366-4 which is the one-motor, three-head four-channel stereo deck type tape recorder, equips with the following features;

Tape Tension Regulator

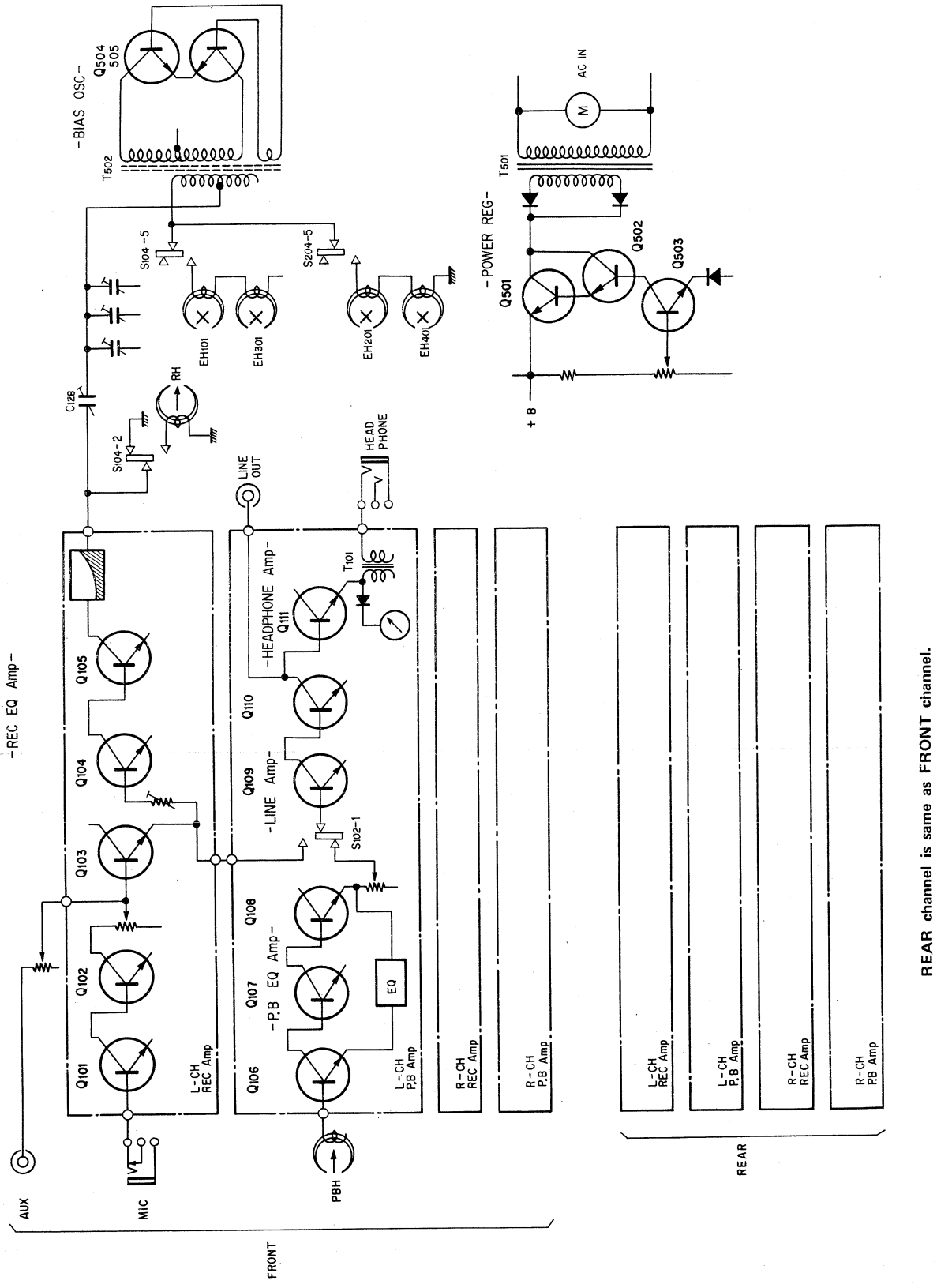
The machine can operate always under the stable tape running by the tape tension regulator which quickly responds to the subtle change of tape tension, so that the tape tension regulator can reduce the wow and flutter extremely.

Automatic Shut-off Mechanism

When threading the tape, the shut-off lever is held by the threaded tape in operating position. If tape runs out or breaks, the shut-off lever swings outward and activates the automatic shut-off mechanism. As a result, the function selector knob can return to the STOP position without setting it manually.

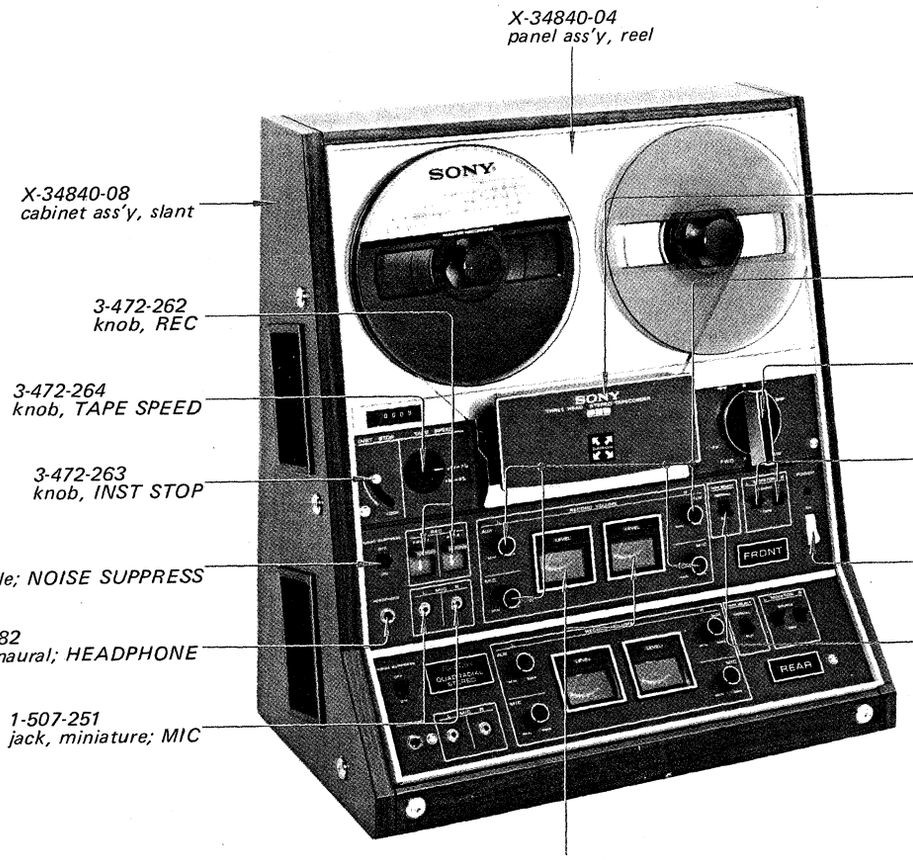
Note: When threading the tape, make certain that there is no slack in the threaded tape, otherwise the function selector knob will not be set at the desired position.

2. BLOCK DIAGRAM

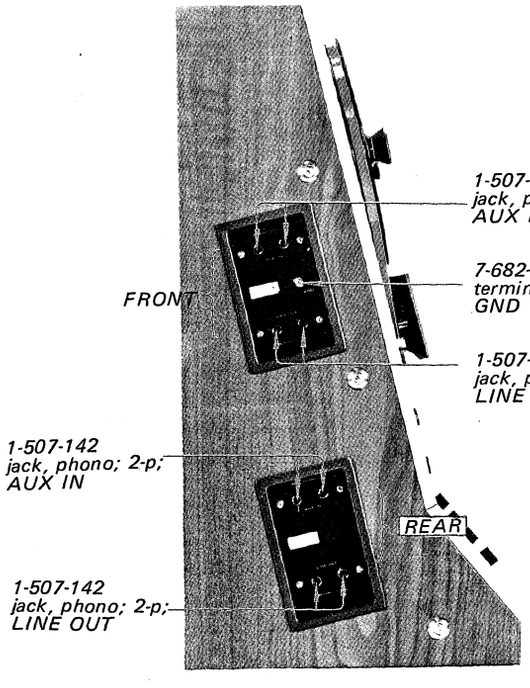


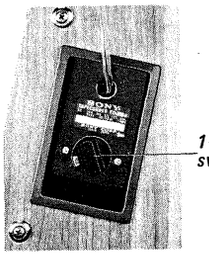
REAR channel is same as FRONT channel.

3. CABINET – TOP VIEW –

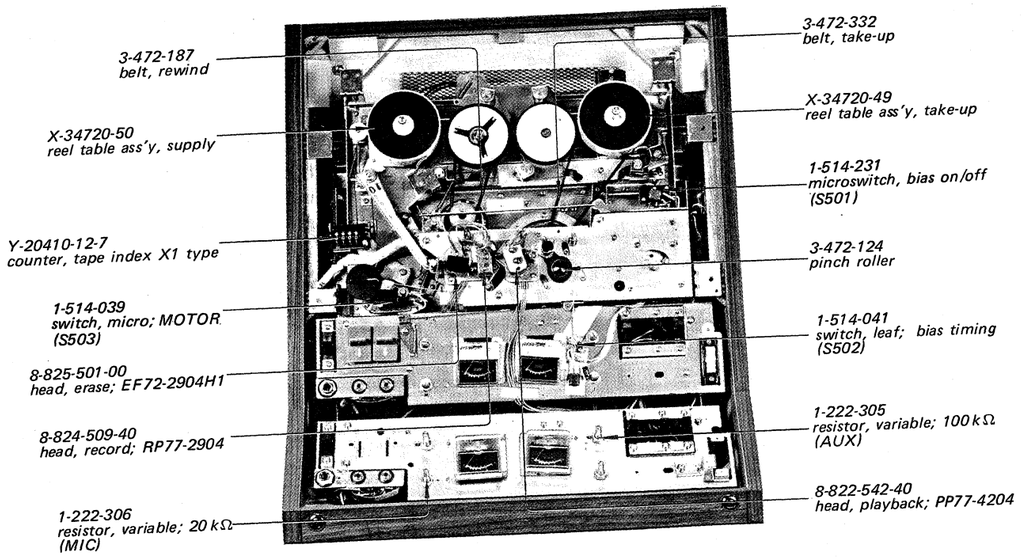


4. CABINET – SIDE VIEW –

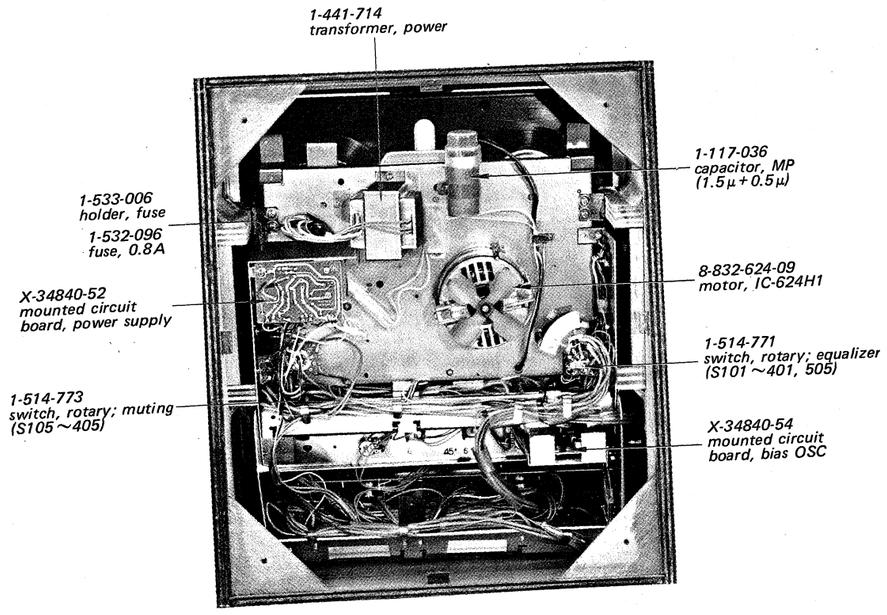




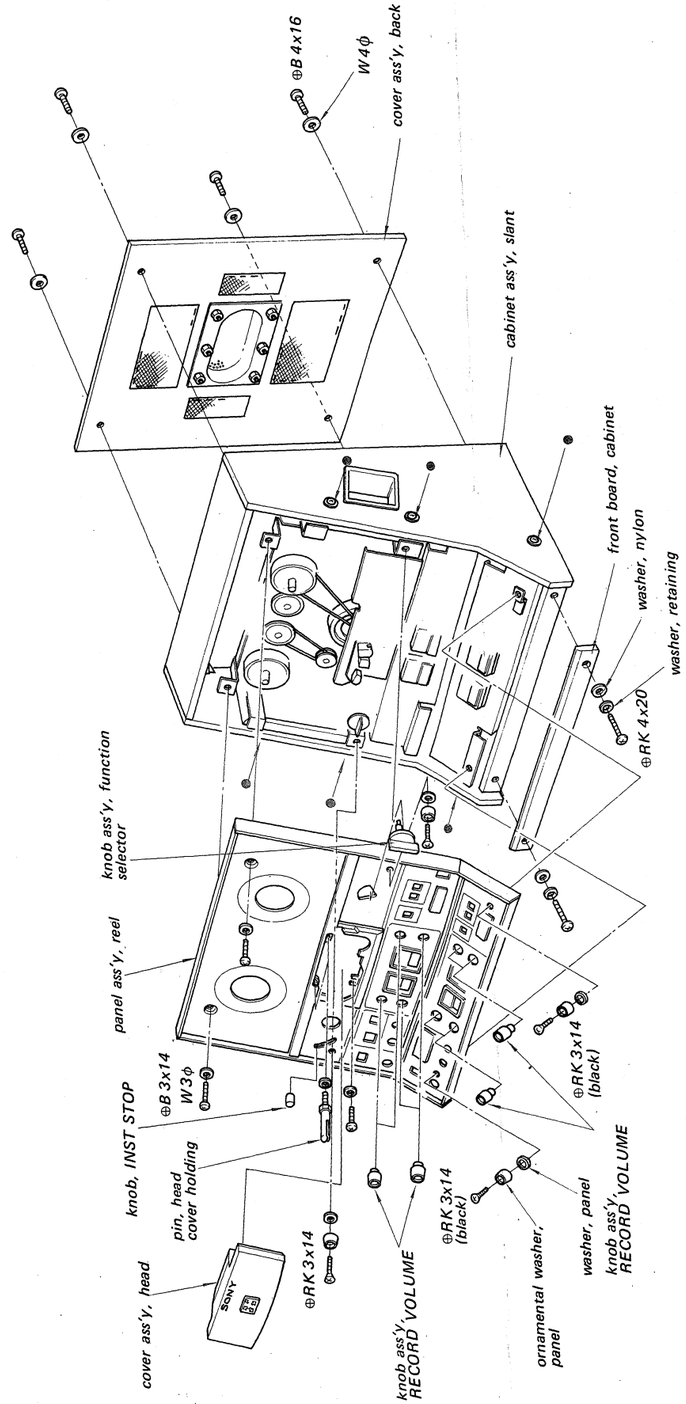
5. CHASSIS – TOP VIEW –



6. CHASSIS – BOTTOM VIEW –

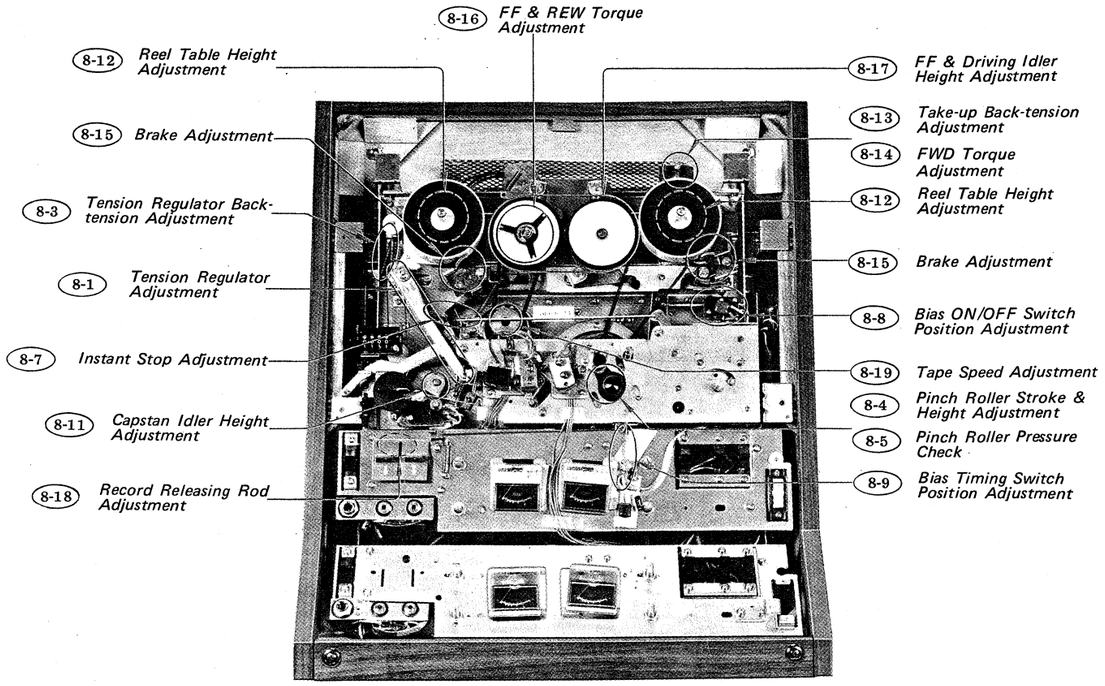


7. DISASSEMBLY



Notes:
(1) When removing the instant stop knob, turn it clockwise.
(2) When removing the chassis, remove the six screws (⊕B 4x45) marked with ● .

8. MECHANICAL ADJUSTMENT


8-16 FF & REW Torque Adjustment
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8-11 Capstan Idler Height Adjustment
8-5 Pinch Roller Pressure Check
8-18 Record Releasing Rod Adjustment
8-9 Bias Timing Switch Position Adjustment

Fig. 8-1 Adjusting parts location (1)

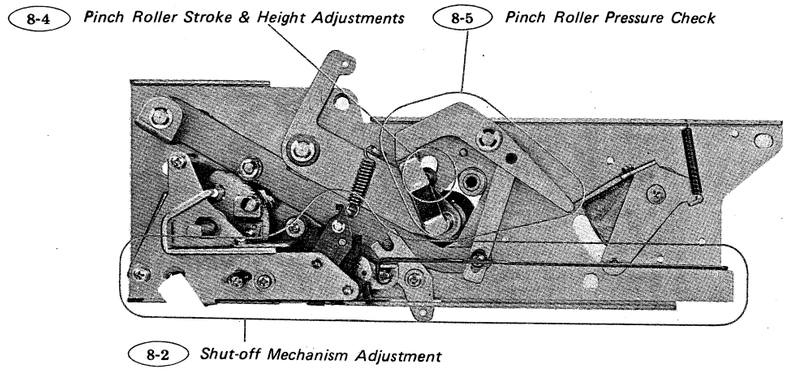


Fig. 8-2 Adjusting parts location (2)

Note: The numbers in the ellipse indicate the adjustment's title number as described in the procedure 8.

In case the parts described in the table below are reassembled or replaced, the following adjustments and checks are necessary.

Parts	Adjusting or Checking Item
Head Deck	8-7. Instant Stop Adjustment (See page 11) 8-9. Bias Timing Switch Position Adjustment (See page 11) 8-18. Record Releasing Rod Adjustment (See page 14)
Motor	8-11. Capstan Idler Height Adjustment (See page 12) 8-19. Tape Speed Adjustment (See page 15)
Reel Table	8-12. Reel Table Height Adjustment (See page 12) 8-13. Take-up Back-tension Adjustment (See page 12) 8-14. FWD Torque Adjustment (See page 12)
Driving Idler	8-16. FF & REW Torque Adjustments (See page 14) 8-17. FF & Driving Idler Height Adjustments (See page 14)
Tension Regulator Arm	8-1. Tension Regulator Adjustment (See page 8)
Tension Regulator Arm Felt	8-3. Tension Regulator Back-tension Adjustment (See page 9)

8-1. Tension Regulator Adjustment

— in STOP mode —

(1) With the tension regulator stopper pushed in the direction shown by arrow in Fig. 8-3, adjust the adjusting screw so that the clearance shown is 7.5 ~ 8 mm ($^{19}/_{64}$ ~ $^{5}/_{16}$") after having been turned the reel table counterclockwise by hand.
(2) After the adjustment, apply lock paint to the screw.

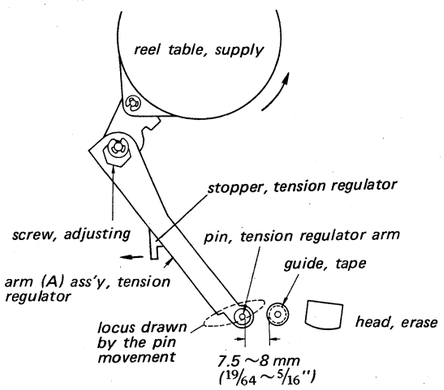
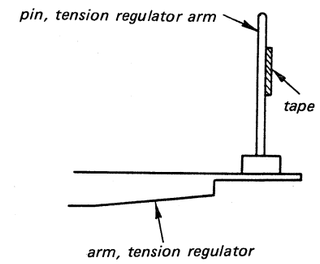


Fig. 8-3 Tension regulator adjustment



Be sure that the tape comes in contact with the tension regulator arm pin uniformly at the beginning and the end of the tape as shown. If not, adjust by bending the tension regulator arm pin.

Fig. 8-4 Tension regulator adjustment

8-2. Shut-off Mechanism Adjustment

— in STOP mode —

(1) Loosen the two screws (A) and adjust by positioning the shut-off lever holding plate ass'y so that the shut-off mechanism is locked when the clearance between the shut-off arm and the head deck is 7 mm (9/32"), and the shut-off mechanism is released completely when it is 1 mm (3/64").

(2) Adjust by changing the hooking position of the spring to obtain the specified values on the spring scale at the beginning and the end of the tape as shown in Fig. 8-6.
If it is not obtained the specified values, adjust by bending the stud or perform the tension regulator adjustment.

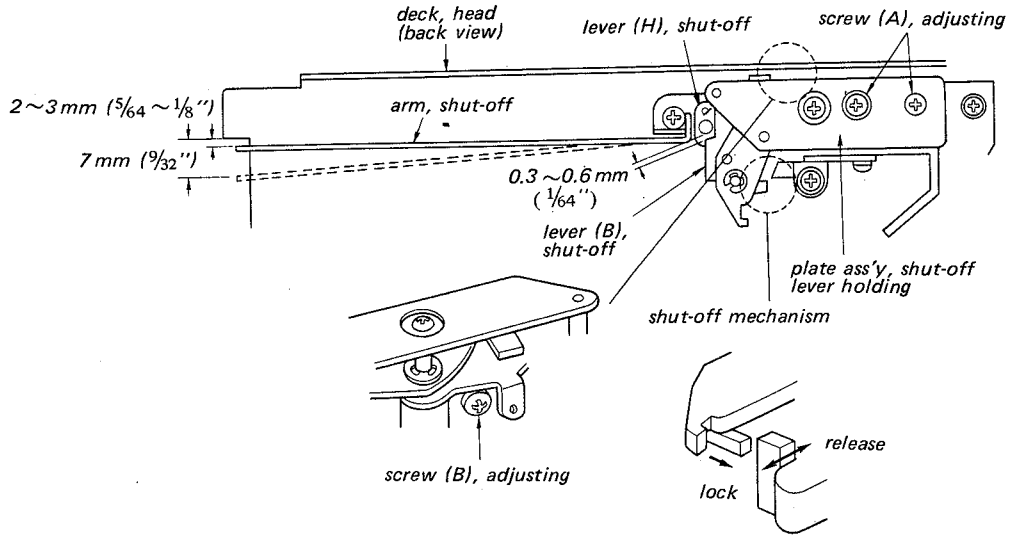


Fig. 8-5 Shut-off mechanism adjustment

(2) Adjust the screw (B) so that the clearance between the shut-off levers (B) and (H) is 0.3~0.6mm (1/64") in STOP mode.
(3) After the adjustment, apply lock paint to the screws.

8-3. Tension Regulator Back-tension Adjustment

In FWD & FF modes

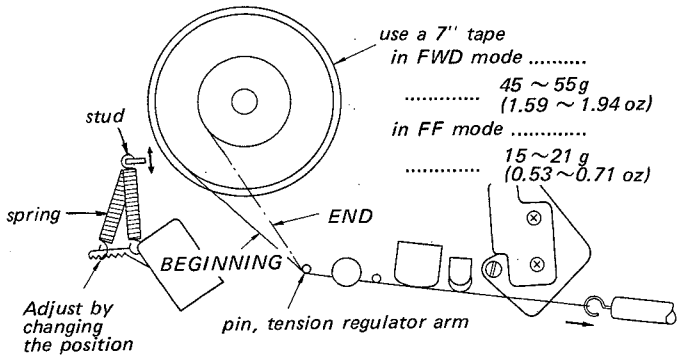


Fig. 8-6 Tension regulator back-tension adjustment

(1) Make the tension regulator adjustment.

8-4. Pinch Roller Stroke & Height Adjustment

(1) Remove the head deck by removing the four screws marked with ▲ on page 55.
(2) Adjust the screw ① so that the pinch roller shaft comes in contact with the retractive lever at the position (A) shown in Fig. 8-8, in STOP mode.
(3) Fix the screw ① while pushing the lever joint in the direction shown by arrow in Fig. 8-7.

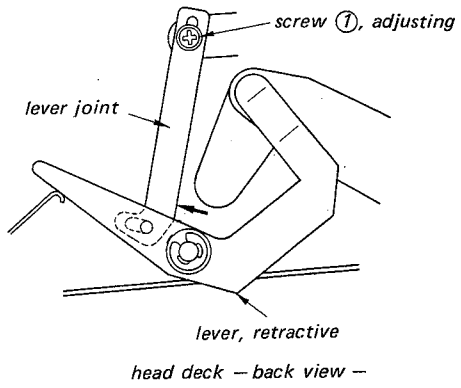


Fig. 8-7 Pinch roller stroke adjustment

(4) Put the dummy capstan ※ into the capstan bearing and be sure that the pinch roller shaft moves by approx. 3～4 mm (1/8～5/32") on the surface of the retractive lever when the function selector knob is changed from STOP to FWD.
(5) Be sure that the washer for the pinch roller shaft does not come in contact with the part indicated with ▲ on the retractive lever shown in Fig. 8-8 when the function selector knob is changed slowly from FWD to FF.
(6) After the adjustment, apply lock paint to the screw.

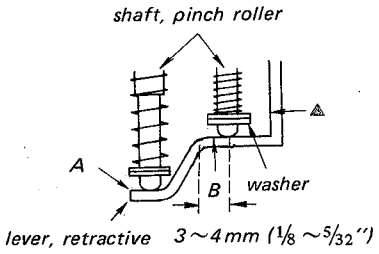


Fig. 8-8 Pinch roller stroke adjustment

(7) Confirm that the pinch roller is as shown in Fig. 8-9.

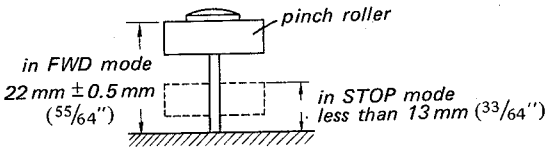


Fig. 8-9 Pinch roller height adjustment

※ **Dummy Capstan**

As the pinch roller stroke adjustment and the pinch roller pressure check require the dummy capstan, make it as follows.
Prepare a flywheel ass'y (for TC-366) and remove the capstan shaft (dummy capstan) from the flywheel ass'y by patting the head of the capstan shaft with the hammer, taking care not to bend the shaft. Flywheel Ass'y Part No.: X-34720-03

8-5. Pinch Roller Pressure Check

– in STOP mode –

(1) Put the dummy capstan ※ into the capstan bearing and be sure that the clearance between the pinch levers (A) and (B) is approx. 0.5mm (1/64").

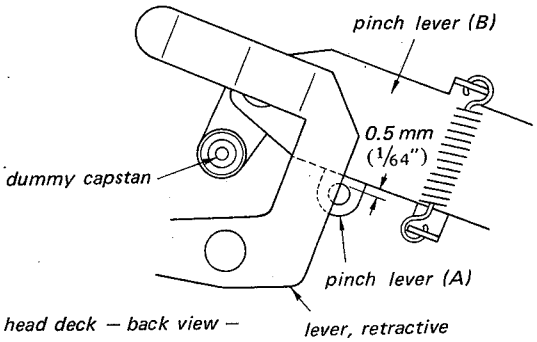


Fig. 8-10 Pinch roller pressure check

Be sure that the spring scale indicates 800～1,000 g (1 lb 12 oz～2 lb 3 oz) when the pinch roller is detached from the capstan in FWD mode.

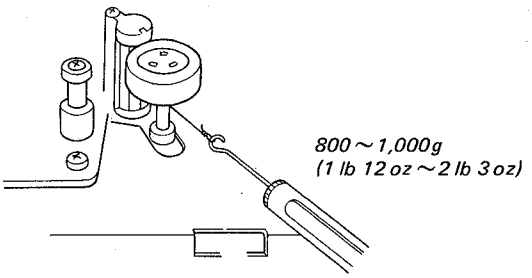


Fig. 8-11 Pinch roller pressure check

8-6. Speed Selector Cam Position Adjustment

– in FWD mode –

Adjust the screw to locate the idler arm (c) pin at the center position between the two stopper slots shown, at 19 cm/s tape speed.

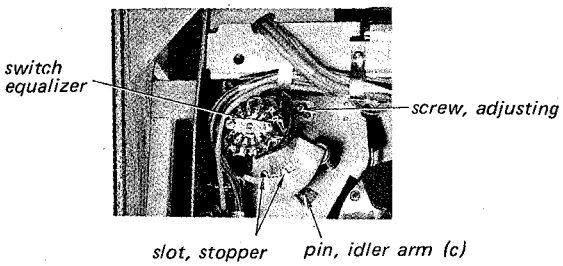


Fig. 8-12 Speed selector cam position adjustment

8-7. Instant Stop Adjustment

– in STOP mode –

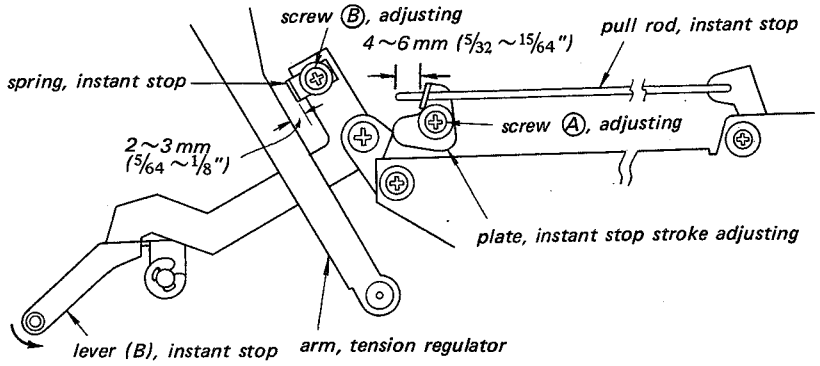


Fig. 8-13 Instant stop adjustment

(1) Be sure that the tension regulator adjustment has been made.
(2) Adjust the screw Ⓐ so that the distance between the end of the instant stop pull rod and the instant stop stroke adjusting plate is 4~6 mm (5/32~15/64") in STOP mode.
(3) Be sure that the clearance between the pinch roller and the capstan is more than 1 mm (3/64") when pulling the instant stop lever (B) in FWD mode, and the instant stop knob is not locked when pulling it in STOP mode.
(4) Adjust the screw Ⓑ so that the clearance between the tension regulator arm and the instant stop spring is 2~3 mm (5/64~1/8") in STOP mode.
(5) After the adjustment, apply lock paint to the screws.

8-8. Bias ON/OFF Switch Position Adjustment

(1) Loosen the two screws and adjust by positioning the switch.
(2) Be sure that the switch is in ON position in FWD mode, and when the function selector knob is changed slowly from FWD to STOP the record knob is released after the switch is in OFF.

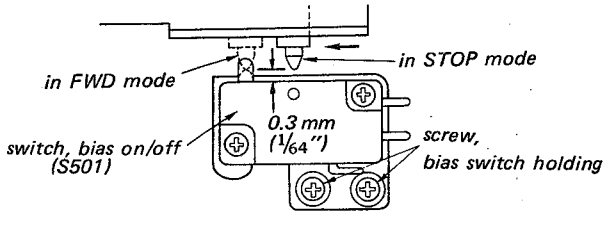


Fig. 8-14 Bias on/off switch position adjustment

8-9. Bias Timing Switch Position Adjustment

– in FWD mode –

Loosen the two screws and adjust by positioning the switch.

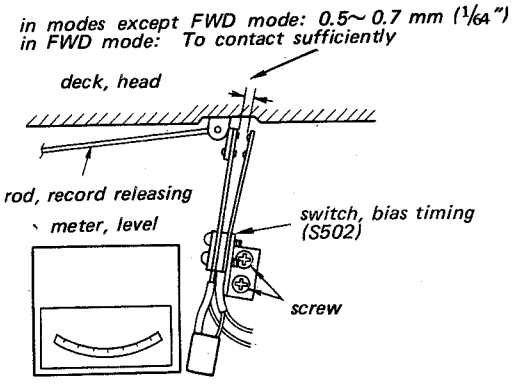


Fig. 8-15 Bias timing switch position adjustment

8-10. Idler Arm (C) Stroke Check

– in FWD mode at 9.5 cm/s (3¾ ips) tape speed –

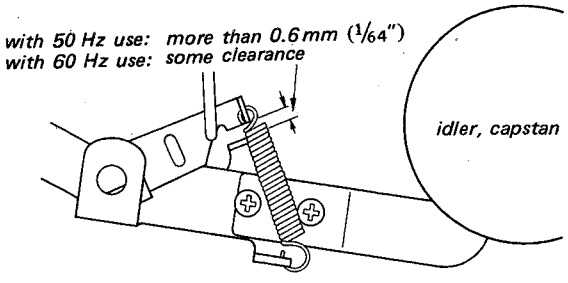


Fig. 8-16 Idler arm (C) stroke check

8-11. Capstan Idler Height Adjustment

– in FWD mode –

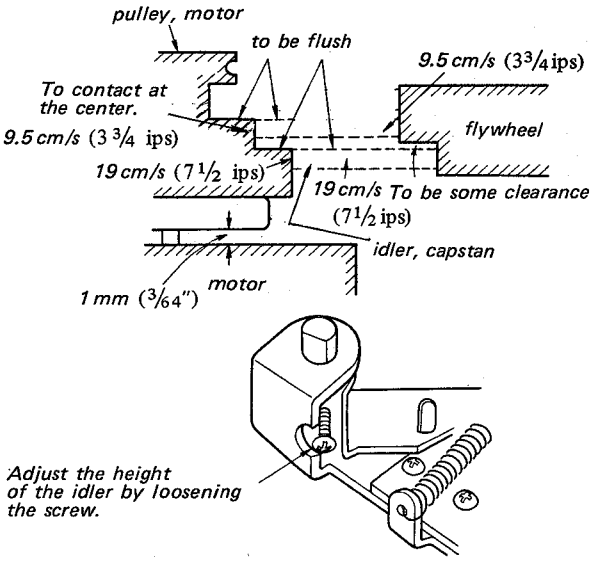


Fig. 8-17 Capstan idler height adjustment

After the adjustment, be sure that the capstan idler does not come in contact with the flywheel and the motor pulley in STOP mode with 60 Hz use and the clearance between the capstan idler and the motor pulley is more than 3 mm (1/8") in STOP mode with 50 Hz use.

8-12. Reel Table Height Adjustment

– in FWD, REW & FF modes –

(1) Adjust the height of the reel table by loosening the screw so that the tape does not come in contact with the flange of the reel in FWD, REW & FF modes.
(2) Perform the back-tension and FWD torque adjustments.
(3) After the adjustment, apply lock paint to the screw.

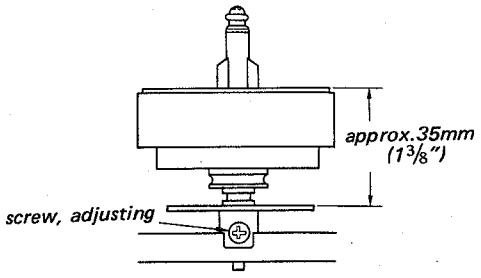


Fig. 8-18 Reel table height adjustment

8-13. Take-up Back-tension Adjustment

– in REW mode –

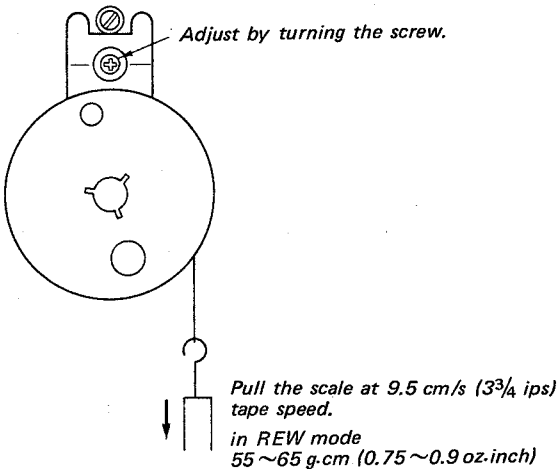


Fig. 8-19 Take-up back-tension adjustment

After the adjustment, perform the FWD torque adjustment and apply lock paint to the screw.

8-14. FWD Torque Adjustment

– in FWD mode –

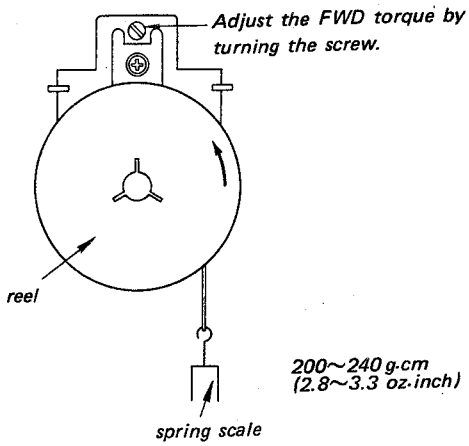


Fig. 8-20 FWD torque adjustment

After the adjustment, perform the take-up back-tension torque and apply lock paint to the screw.

8-15. Brake Adjustment

– in STOP mode –

supply reel table braking torque	direction A	150 ~ 250 g·cm (2.1 ~ 3.5 oz·inch)
	direction B	1,300 ~ 1,700 g·cm (18 ~ 24 oz·inch)

take-up reel table braking torque	direction C	350 ~ 450 g·cm (4.9 ~ 6.2 oz·inch)
	direction D	1,300 ~ 1,700 g·cm (18 ~ 24 oz·inch)

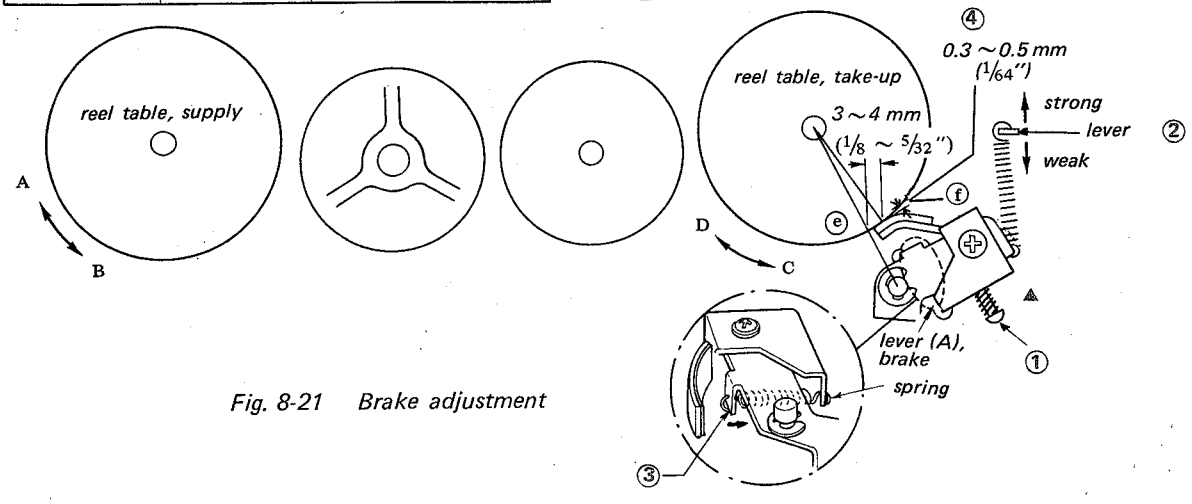


Fig. 8-21 Brake adjustment

8-15-1. Supply Brake Adjustment

Note: Make the supply brake torque adjustment, after having performed the tension regulator adjustment.

When the reading on the spring scale is greater than the values indicated, adjust by changing the position of the spring.

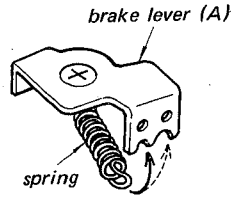


Fig. 8-22 Supply brake adjustment (1)

When the reading on the spring scale is less than the values indicated, adjust by bending the tab of the brake lever (B).

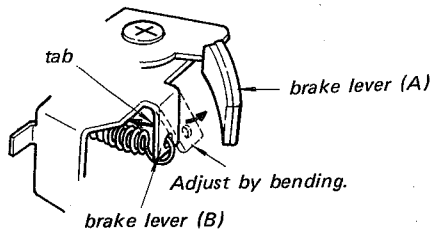


Fig. 8-23 Supply brake adjustment (2)

8-15-2. Take-up Brake Adjustment (Fig. 8-21)

① **Brake Pressure Angle Adjustment**

Adjust by turning the screw marked ▲ so that the distance shown with ⓔ is 3 ~ 4 mm (1/8 ~ 5/32").
After the adjustment, apply lock paint to the screw.

② **Take-up Brake Adjustment in the direction shown with C.**

Adjust by bending the lever.

③ **Take-up Brake Adjustment in the direction shown with D.**

- When the reading on the spring scale is greater than the values indicated, bend the lever in the direction shown with the arrow.
- When the reading on the spring scale is less than the values indicated, cut off one turn of the spring end and hook the spring.

④ Make sure that the clearance between the take-up reel table and the brake is 0.3 ~ 0.5 mm (1/64") in rewind mode.

8-15-3. Tape Slack Check

After the adjustments, thread the tape on the machine as shown in Fig. 8-24 and make sure not to slack the tape when changing to STOP mode from FF mode and slowly to REC mode from STOP mode.

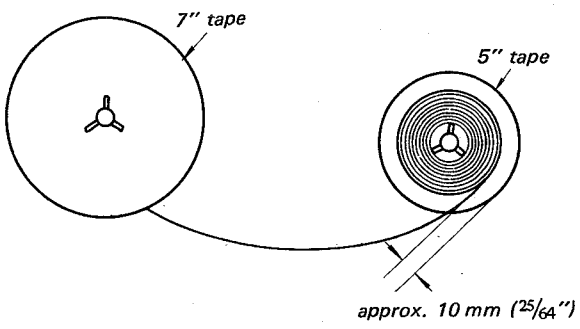


Fig. 8-24 Tape slack check

8-16. FF & REW Torque Adjustments

– in FF & REW modes –

Adjust the position of the leaf spring to obtain the specified values on the spring scale.
(Read the values when the driving idler is forced to stop the motion.)

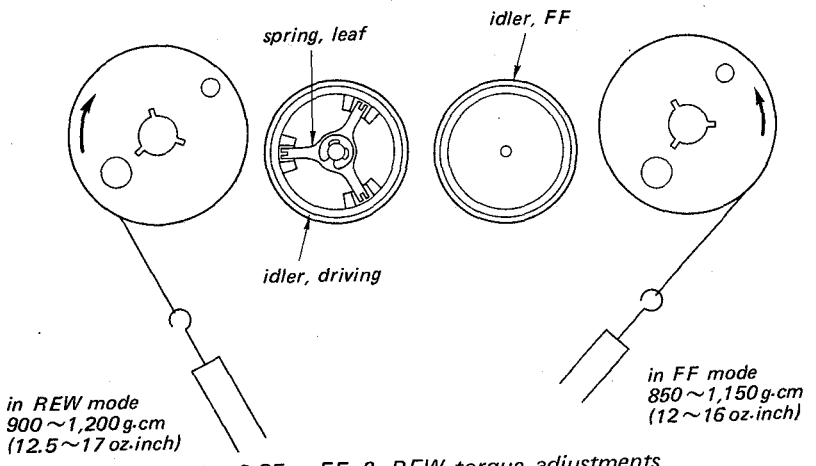
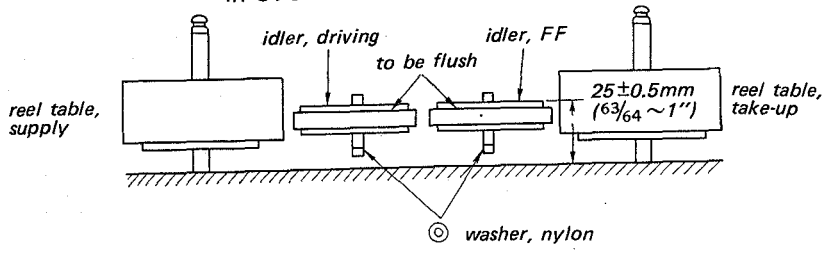


Fig. 8-25 FF & REW torque adjustments

8-17. FF & Driving Idler Height Adjustments

– in STOP mode –



Adjust the height of the idler by adding or removing the nylon washer.

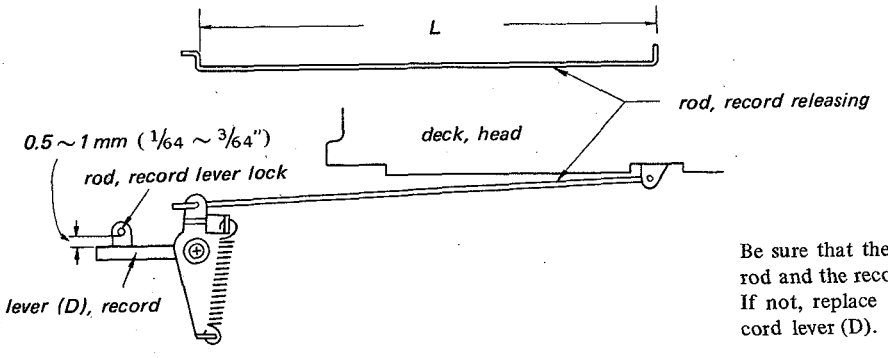
nylon washer

Part No.	Thickness
3-425-197-01	0.13 mm
3-425-197-11	0.25 mm
3-425-197-21	0.50 mm

Fig. 8-26 FF & Driving idler height adjustments

8-18. Record Releasing Rod Adjustment

– in STOP mode –



rod, record releasing

Part No.	L (length)
3-472-240-02	150 mm
3-472-240-11	150.5 mm
3-472-240-21	151 mm

Be sure that the clearance between the record lever lock rod and the record lever (D) is 0.5 ~ 1 mm (1/64 ~ 3/64"). If not, replace the record releasing rod or bend the record lever (D).

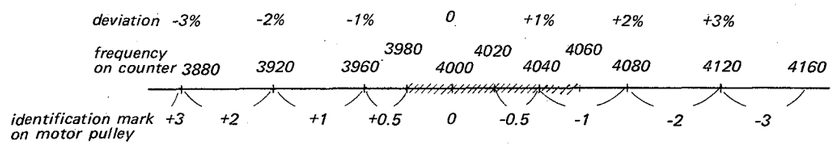
Fig. 8-27 Record releasing rod adjustment

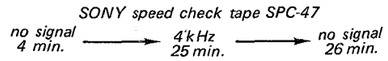
8-19. Tape Speed Adjustment

— in FWD mode —

(1) Play back the SONY speed check tape (SPC-47) at 19 cm/s (7½ ips) tape speed in horizontal position.

(2) If the counter reading is out of 3,980 ~ 4,060 Hz replace with the motor pulley with identification mark shown below.
(As for Part No. of the motor pulley, refer to page 62.)





Specification:

	19 cm/s (7 1/2 ips)	9.5 cm/s (3 3/4 ips)
Deviation (%)	±1.5	±1.5
Variation Limit (%)	1	1

Fig. 8-28 Tape speed adjustment

MEMO

9. ELECTRICAL ADJUSTMENT

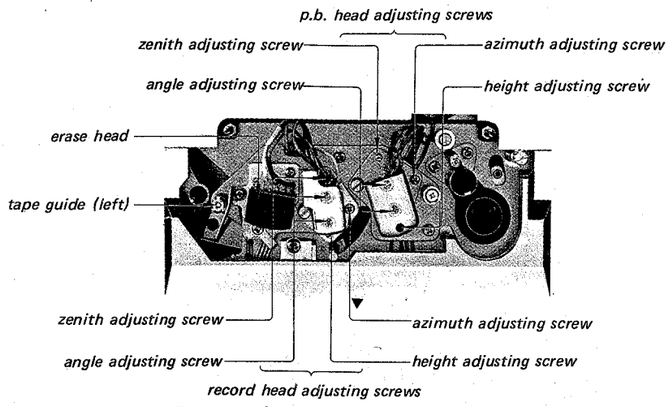


Fig. 9-1 Adjusting parts location (1)

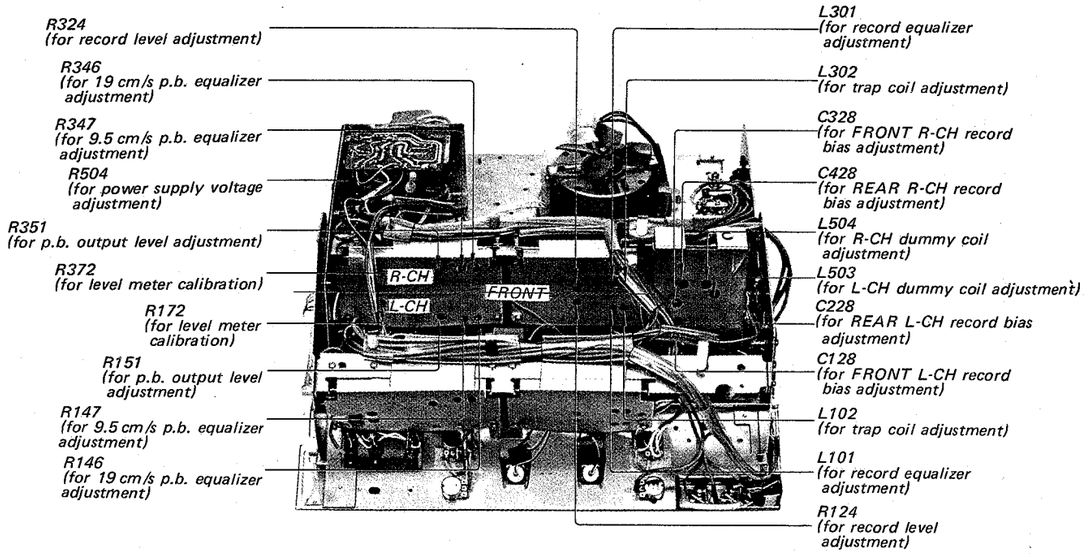

R324 (for record level adjustment)
R346 (for 19 cm/s p.b. equalizer adjustment)
R347 (for 9.5 cm/s p.b. equalizer adjustment)
R504 (for power supply voltage adjustment)
R351 (for p.b. output level adjustment)
R372 (for level meter calibration)
R172 (for level meter calibration)
R151 (for p.b. output level adjustment)
R147 (for 9.5 cm/s p.b. equalizer adjustment)
R146 (for 19 cm/s p.b. equalizer adjustment)
R-CH
L-CH
FRONT
L301 (for record equalizer adjustment)
L302 (for trap coil adjustment)
C328 (for FRONT R-CH record bias adjustment)
C428 (for REAR R-CH record bias adjustment)
L504 (for R-CH dummy coil adjustment)
L503 (for L-CH dummy coil adjustment)
C228 (for REAR L-CH record bias adjustment)
C128 (for FRONT L-CH record bias adjustment)
L102 (for trap coil adjustment)
L101 (for record equalizer adjustment)
R124 (for record level adjustment)

Fig. 9-2-1 Adjusting parts location (2)

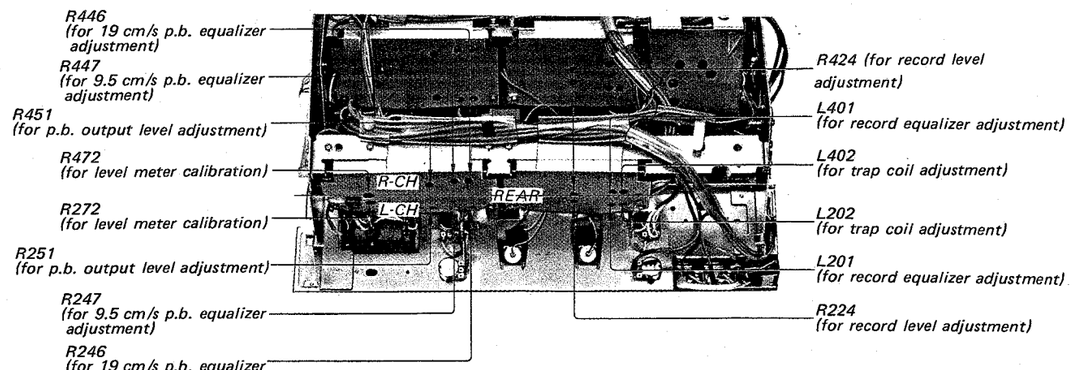

R446 (for 19 cm/s p.b. equalizer adjustment)
R447 (for 9.5 cm/s p.b. equalizer adjustment)
R451 (for p.b. output level adjustment)
R472 (for level meter calibration)
R272 (for level meter calibration)
R251 (for p.b. output level adjustment)
R247 (for 9.5 cm/s p.b. equalizer adjustment)
R246 (for 19 cm/s p.b. equalizer adjustment)
R-CH
L-CH
REAR
R424 (for record level adjustment)
L401 (for record equalizer adjustment)
L402 (for trap coil adjustment)
L202 (for trap coil adjustment)
L201 (for record equalizer adjustment)
R224 (for record level adjustment)

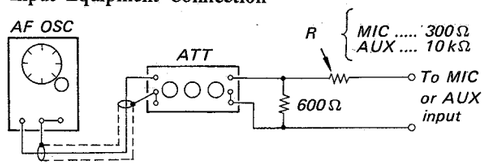
Fig. 9-2-2 Adjusting parts location (3)

Preparations:

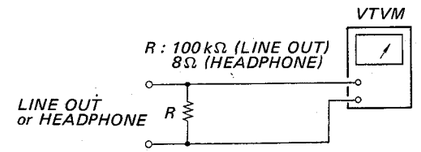
(1) Before connecting the measuring equipments to the input or the output jack of the machine, take the impedance-matching correctly as shown below.

Input	Rated Input Level (Input Impedance)	Output	Rated Output Level (Load Impedance)
MIC	-60 dB (600Ω)	LINE OUT	0 dB (100 kΩ)
AUX	-10 dB (10 kΩ)	HEAD-PHONE	-28 dB (8 Ω)

Input Equipment Connection



Output Equipment Connection



(2) During the adjustment, the RECORD VOLUME controls and the switches should be set in the following positions, unless otherwise specified.

MIC RECORD VOLUME: Set them to the position where the LINE OUT level is 0 dB (0.775 V) when delivering a 1 kHz signal of -60 dB (0.775 mV) into the MIC jack with the AUX RECORD VOLUME set to the minimum position and the MONITOR switch set to the SOURCE position.

AUX RECORD VOLUME: Set them to the position where the LINE OUT level is 0 dB (0.775 V) when delivering a 1 kHz signal of -10 dB (0.24 V) into the AUX IN jack with the MIC RECORD VOLUME set to the minimum position and the MONITOR switch set to the SOURCE position.

TAPE SELECT switch: NORMAL.

TAPE SPEED switch: 19 cm/s (7½ ips)

NOISE SUPPRESS switch: OFF

MONITOR switch: TAPE

(3) Before making the head adjustment, demagnetize and clean the record head and the p.b. head with swab or soft cloth dampened with denatured alcohol.

(4) A sufficiently-demagnetized tape should be used as a blank tape.

(5) Alignment tapes contain the following information:

Name of alignment tape \ Position	1st tone	2nd tone	3rd tone	4th tone	5th tone	6th tone	7th tone
J-19-K1	10kHz -10dB	400Hz 0dB	-	-	-	-	-
J-19-F1	10kHz -10dB	400Hz 0dB	400Hz -10dB	10kHz -10dB	7kHz -10dB	80Hz -10dB	40Hz -10dB

(6) The adjustment should be made in numerial order.

1. Power Supply Voltage Adjustment
2. Tape Path Adjustment
3. Tape Curl Adjustment
4. P.B. Head Azimuth & Phase Adjustment
5. P.B. Output Level Adjustment
6. P.B. Equalizer Adjustment
7. Level Meter Calibration
8. Trap Coil Adjustment
9. Record Head Track Position Adjustment
10. Record Head Azimuth Adjustment
11. Record Bias Adjustment
12. Record Level Adjustment
13. Record Equalizer Adjustment
14. Overall Frequency Response, S/N Ratio and Distortion Measurements
15. Dummy Coil Adjustment
16. Erase Ratio Measurement

9-1. Power Supply Voltage Adjustment

Adjustment Procedure:

(1) Place the machine in STOP mode.
(2) Be sure that the correct ac power supply voltage is supplied.
(3) Connect a VTVM to the emitter of Q501.
(4) Adjust R504 with an insulated screwdriver to obtain 25～26 V on the VTVM.

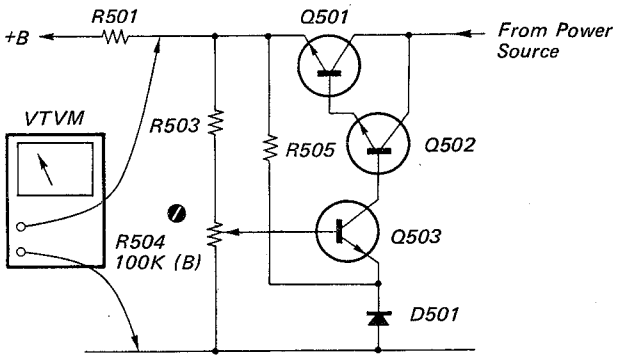


Fig. 9-3 Power supply voltage adjustment

9-2. Tape Path Adjustment

(A) Tape Guide (left) Adjustment

Adjusting Parts:

tape guide (left)..... See Fig. 9-1.

(1) Thread a tape.
(2) Align the upper edge of the tape just on the upper edge of the erase head core by turning the tape guide located on the left side of the erase head.
(3) Turn the tape guide located on the left side of the erase head clockwise by approximately 35° from the position obtained in the preceding procedures, so that the upper edge of the tape is approximately 0.05 mm lower than that of the erase head core.

(B) Tentative Record and P.B. Heads Adjustments

Adjusting Parts: (See Fig. 9-1)

- P.B. Head
  ① azimuth adjusting screw
  ② height adjusting screw
  ③ zenith adjusting screw

- Record Head
  ① azimuth adjusting screw
  ② height adjusting screw
  ③ zenith adjusting screw

Adjustment Procedures:

(1) Thread a blank tape.
(2) Set the machine in FWD mode at the 19 cm/s (7½ ips) tape speed.
(3) Make the tape loose a little by pushing the tension regulator arm pin in the direction shown with the arrow in Fig. 9-5 and then adjust the p.b. head zenith and azimuth adjusting screws and the record head zenith and azimuth adjusting screws to obtain the reflection of light as shown in Fig. 9-5.
(4) Set the machine in STOP mode.
(5) Turn the p.b. head azimuth adjusting screw so that the upper edge of the p.b. head core is parallel with that of the tape.
(6) Turn the p.b. head height adjusting screw to align the upper edge of the p.b. head core and that of the tape and memorize the number of turns of the screw.
(7) Turn the p.b. head zenith adjusting screw by the same number of turns in the same direction of the p.b. head height adjusting screw.

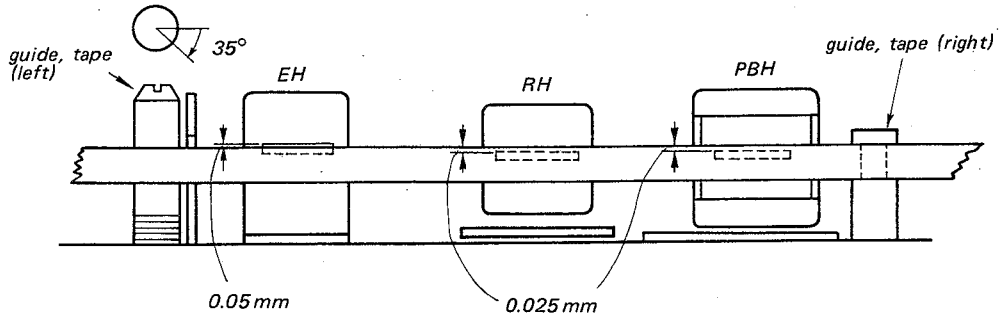


Fig. 9-4 Tape guide (left) adjustment

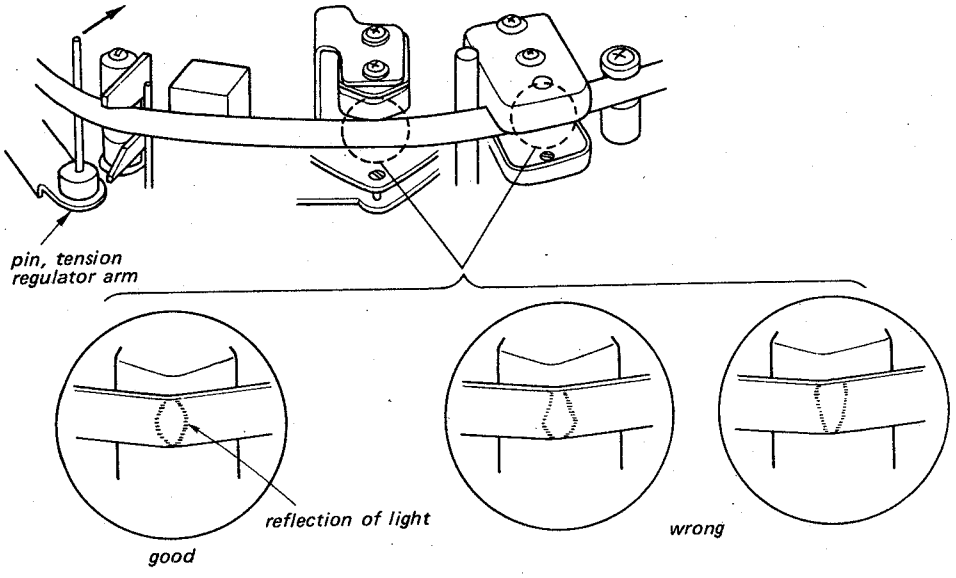


Fig. 9-5 Tentative record and p.b. heads adjustment

(8) Repeat the above procedures (6) and (7) to align the upper edge of the p.b. head core and that of the tape.

(9) Turn the p.b. head zenith and height adjusting screws counterclockwise by approximately 20° from the position obtained in the preceding procedure (8) so that the upper edge of the p.b. head core is 0.025mm lower than that of the tape.

(10) Turn the record head azimuth adjusting screw so that the upper edge of the record head core is parallel with that of the tape.

(11) Turn the record head height adjusting screw to align the upper edge of the record head core and that of the tape and memorize the number of turns of the screw.

(12) Turn the record head zenith adjusting screw by the same number of turns in the same direction of the record head height adjusting screw.

(13) Repeat the above procedures (11) and (12) to align the upper edge of the record head core and that of the tape.

(14) Turn the record head zenith and height adjusting screws counterclockwise by approximately 20° from the position obtained in the preceding procedure (13) so that the upper edge of the record head core is 0.025 mm lower than that of the tape.

(15) Set the machine in FWD mode at the 19 cm/s (7½ ips) tape speed.

(16) Be sure to obtain the reflection of light as shown in Fig. 9-5 on the tape at the p.b. and record heads by pushing the tension regulator arm pin in the direction shown by the arrow in Fig. 9-5. If not, repeat the above procedures (3)~(14).

9-3. Tape Curl Adjustment

Adjustment Procedures:

(1) Set the machine at 9.5 cm/s (3¾ ips) tape speed.

(2) Be sure that the tape comes in contact with the two tape guides exactly as shown in Fig. 9-6.

- If the tape is curled at the left tape guide, adjust by bending the tension regulator arm pin with fingers.
- If the tape is curled at the right tape guide, loosen the two capstan bearing holding screws and adjust by adding or removing the mylar spacer.

Note: After adding or removing the mylar spacer, perform the p.b. head zenith adjustment.

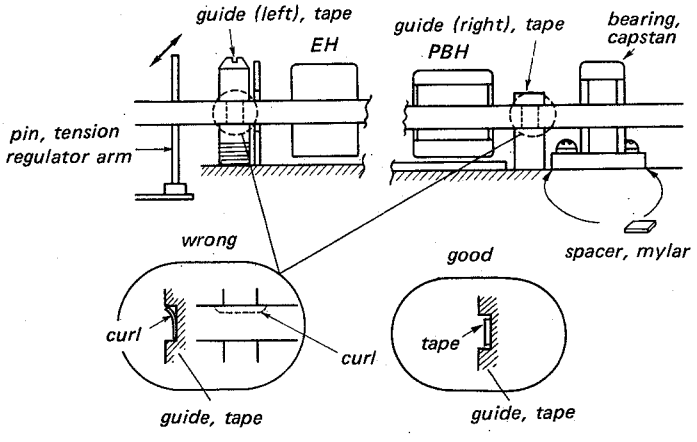


Fig. 9-6 Tape curl adjustment

9-4. P.B. Head Azimuth & Phase Adjustment

Adjustment Procedure:

(1) Be sure that the tape path adjustment has been made.
(2) Connect a VTVM to the LINE OUT jack.
(3) Play back the 1st tone (10 kHz) of SONY alignment tape, J-19-F1 or J-19-K1.
(4) Adjust the p.b. head azimuth adjusting screw with a non-magnetic screwdriver to obtain the maximum reading on the VTVM at four channels.
(5) Memorize the angle of azimuth adjusting screw obtained the maximum VTVM reading at every channel.
(6) If the maximum value of every channel can not be obtained at the same angle of the screw, take the mid position between the farthest two angles among four channels.
(7) Recheck the value on the VTVM at every channel. At that time, if the difference between the maximum and the minimum readings is more than 1 dB on the VTVM, replace the p.b. head, and repeat the procedures from 9-2 to 9-4.
(8) If the azimuth adjusting screw is turned more than 180 degrees, readjust the tape path.
(9) Apply the lock paint to the azimuth adjusting screw.

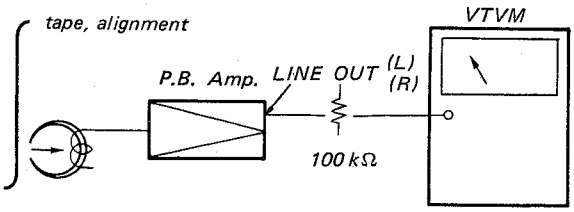


Fig. 9-7 P.B. head azimuth and phase adjustment setup

(10) Disconnect the VTVM.
(11) Connect an oscilloscope to the LINE OUT or the HEADPHONE jack.
(12) Play back the 2nd tone (400 Hz) of SONY alignment tape, J-19-F1 or J-19-K1.
(13) Make sure that the Lissajous figures on the oscilloscope between left and right channels and also front and rear channels indicate the same phase.
(14) If the phase is not the same, readjust the steps from 2 to 9.

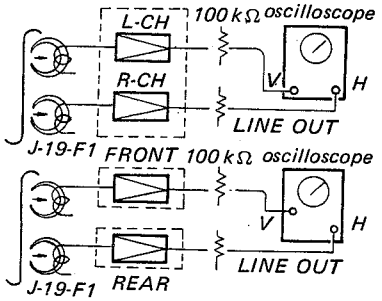


Fig. 9-8 P.B. head phase check

9-5. P.B. Output Level Adjustment

Adjustment Procedure:

(1) Connect a VTVM to the LINE OUT jack.
(2) Play back the 2nd tone (400 Hz) of SONY alignment tape, J-19-F1 or J-19-K1.
(3) Set the MONITOR switch to the TAPE position.
(4) Adjust R151, R251, R351 and R451 to obtain 0 dB (0.775 V) on the VTVM.
(5) Apply the lock paint to the semi-fixed resistors.

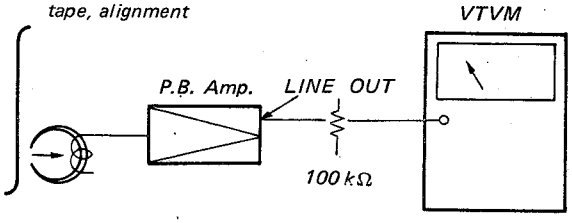


Fig. 9-9 P.B. output level adjustment

9-6. P.B. Equalizer Adjustment

Adjustment Procecure:

(1) Connect a VTVM to the LINE OUT jack.
(2) Set the MONITOR switch to the TAPE position.
(3) Set the TAPE SPEED switch to the 19 cm/s (7½ ips) position.
(4) Play back the 3rd tone (400 Hz) of SONY alignment tape J-19-F1.
(5) Memorize the reading on the VTVM at four channels.
(6) Play back the 4th tone (10 kHz) of SONY alignment tape J-19-F1.

(7) Adjust R146, R246, R346 and R446 so that the VTVM indicates 0.5 dB lower than the value obtained in the preceding step 5 at every channel.
(8) Play back the 5th, 6th and 7th tones of SONY alignment tape J-19-F1.
(9) Check that the reading on the VTVM at every tone indicates the specified value as described below.
(10) Change the TAPE SPEED switch to the 9.5 cm/s (3¾ ips) position.
(11) Play back the 3rd tone of SONY alignment tape J-19-F1.
(12) Memorize the reading on the VTVM at four channels.
(13) Play back the 4th tone of SONY alignment tape J-19-F1.
(14) Adjust R147, R247, R347 and R447 so that the VTVM reading is the same as the reading obtained in the preceding step 12 at every channel.
(15) Play back the 5th tone of SONY alignment tape J-19-F1.
(16) Check that the reading on the VTVM indicates the specified value as described below.

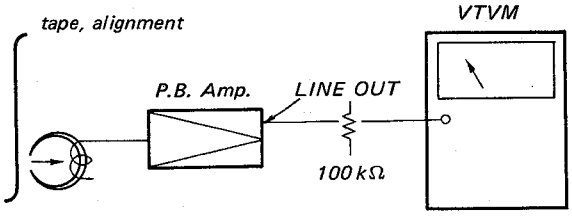


Fig. 9-10 P.B. equalizer adjustment setup

Deviation against 400 Hz at 19 cm/s tape speed

tone / tape	4th (10 kHz)	5th (7 kHz)	6th (80 Hz)	7th (40 Hz)
J-19-F1	-0.5 dB	-0.5±2 dB	+1.5±2 dB	+2.5±2 dB

Deviation against 200 Hz at 9.5 cm/s tape speed

tone / tape	4th (5 kHz)	5th (3.5 kHz)
J-19-F1	±1 dB	±2 dB

9-7. Level Meter Calibration

Adjustment Procedure:

(1) Connect a VTVM to the LINE OUT jack.
(2) Connect an AF Oscillator to the MIC jack.
(3) Set the MONITOR switch to the SOURCE position.
(4) Deliver a 1 kHz signal of -60 dB (0.77 mV) into the MIC jack from the AF Oscillator.
(5) Adjust the MIC VOLUME control so that the output level of LINE OUT becomes 0 dB (0.775 V).
(6) Adjust R172, R272, R372 and R472 to indicate the position illustrated below on the level meter.
(7) Check the output level of LINE OUT when the TAPE SELECT switch is in the NORMAL position.
(8) Set the TAPE SELECT switch to the SPECIAL position.
(9) Make sure that the VTVM indicates 2 ~ 3 dB lower than the value obtained in the preceding step 7 at every channel.

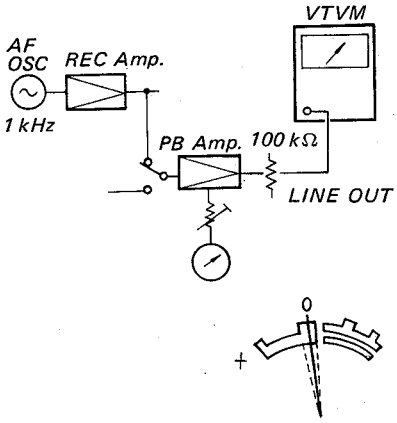


Fig. 9-11 Level meter calibration setup

9-8. Trap Coil Adjustment

Adjustment Procedure:

(1) Connect a VTVM to the check point shown in Fig. 9-12.
(2) Place the machine in 4-channel stereo record mode.
(3) Set the MIC and AUX VOLUME control counterclockwise to the full.
(4) Adjust L102, L202, L302 and L402 to obtain the minimum reading on the VTVM.

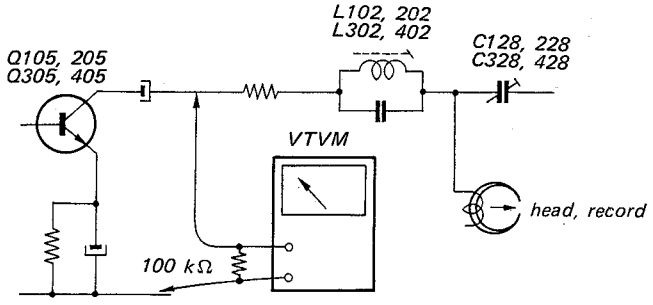


Fig. 9-12 Trap coil adjustment setup

9-9. Record Head Track Position Adjustment

Adjustment Procedure:

(1) Make sure that the tape path adjustment has been made.
(2) Set the MONITOR switch to TAPE position.
(3) Connect an AF Oscillator to the MIC jack of FRONT R-channel.
(4) Connect a VTVM to the LINE OUT jack.
(5) Set the MIC VOLUME control of FRONT R-channel to the specified position in the preparation.
(6) Deliver a 1 kHz signal of -60 dB (0.775 mV) into the MIC jack.
(7) Thread a blank tape and place the machine in the record mode.
(8) Adjust the azimuth, height and zenith adjusting screws of record head for the maximum reading on the VTVM.
(9) After the adjustment, check the tape path again.

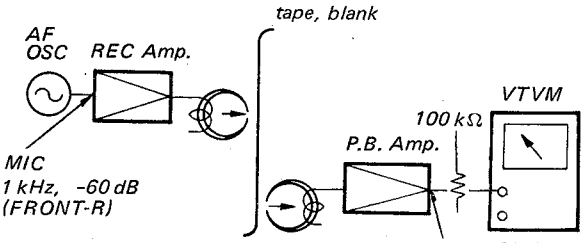


Fig. 9-13 Record head track position adjustment setup

9-10. Record Head Azimuth Adjustment

Adjustment Procedure:

(1) Set the MONITOR switch to TAPE position.
(2) Connect an AF Oscillator to the MIC jack.
(3) Connect a VTVM to the LINE OUT jack.
(4) Set the MIC VOLUME control to the specified position in the preparation (2).
(5) Deliver a 1 kHz signal of -90 dB (24.5 μV) into the MIC jack from the AF Oscillator.
(6) Thread a blank tape and place the machine in the record mode.
(7) Adjust the record head azimuth adjusting screw for the maximum reading on the VTVM at every channel.
(8) Memorize the angle of azimuth adjusting screw where the maximum VTVM reading at every channel is obtained.
(9) If the maximum value of every channel can not be obtained at the same angle of the screw, take the mid between the farthest two angles among four channels.
(10) Recheck the value on the VTVM at every channel. At that time, if the difference between the maximum and the minimum readings is more than 1 dB on the VTVM, replace the record head, and repeat the procedures 9-2, 9-9 and 9-10.
(11) If the azimuth adjusting screw is turned more than 180 degrees, readjust record head track position adjustment.
(12) Apply the lock paint to the azimuth adjusting screw.

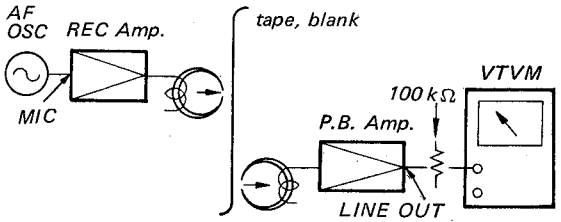


Fig. 9-14 Record head azimuth adjustment setup

9-11. Record Bias Adjustment

Adjustment Procedure:

(1) Set the MONITOR switch to the TAPE position.
(2) Connect an AF Oscillator to the MIC jack.
(3) Connect a VTVM to the LINE OUT jack.
(4) Set the MIC VOLUME control to the specified position in the preparation (2).
(5) Deliver a 1 kHz signal of -60 dB (0.775 mV) into the MIC jack from the AF Oscillator.
(6) Thread a blank tape and place the machine in the record mode.
(7) Turn the trimmer capacitors C128, C228, C328 and C428 fully clockwise and turn it several turns counterclockwise.
(8) Turn the trimmer capacitors clockwise slowly until the VTVM reads the maximum value.
(9) Change the 1 kHz signal level from -60 dB (0.775 mV) to -90 dB (24.5 μV).
(10) Turn the trimmer capacitors finely to obtain the maximum value on the VTVM.
(11) Change the signal from 1 kHz to 10 kHz.

(12) Finely turn the trimmer capacitors clockwise so that the line output level at 10 kHz is 0±5 dB against the output at 1 kHz.

Note: The output level at 1 kHz should not drop more than 1 dB below the peak level.

(13) Apply the lock paint to the trimmer capacitors.

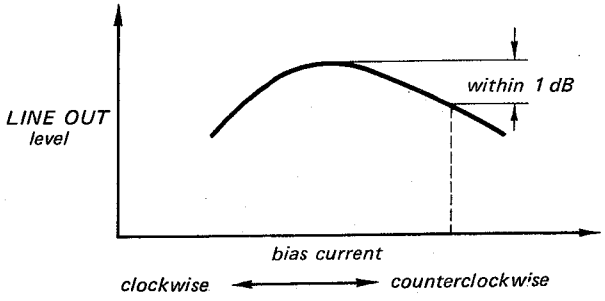


Fig. 9-15 Record bias characteristics

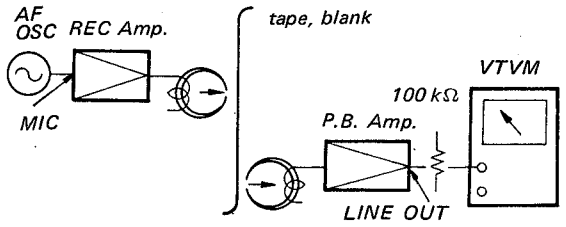


Fig. 9-16 Record bias adjustment setup

9-12. Record Level Adjustment

Adjustment Procedure:

(1) Set the MONITOR switch to the TAPE position.
(2) Connect the AF Oscillator to the MIC jack.
(3) Connect a VTVM to the LINE OUT jack.
(4) Set the MIC VOLUME control to the specified position in the preparation (2).
(5) Deliver a 1 kHz signal of -60 dB (0.775 mV) into the MIC jack from the AF Oscillator.
(6) Thread a blank tape and place the machine in the 4-channel stereo record mode.
(7) Adjust R124, R224, R324 and R424 to obtain 0 dB (0.775 V) on the VTVM.
(8) Make sure that the difference between the level in the 4-channel record mode and the level in the 2-channel record mode is within 1 dB.
(9) Change the TAPE SPEED switch to the 9.5 cm/s position.
(10) Place the machine in the 4-channel stereo record mode.
(11) Make sure that the difference of level between channels is within 2 dB.

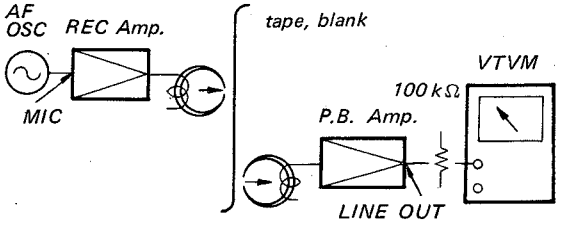


Fig. 9-17 Record level adjustment setup

9-13. Record Equalizer Adjustment

Adjustment Procedure:

(1) Connect an AF Oscillator to the MIC jack and a VTVM to the LINE OUT jack.
(2) Set the MONITOR switch to the TAPE position and the MIC VOLUME control to the specified position in the preparation (2).
(3) Deliver a 1 kHz signal of -90 dB (24.5 μV) into the MIC jack from the AF Oscillator.
(4) Record the signal on the blank tape.
(5) Change the signal from 1 kHz to 18 kHz.
(6) Adjust the equalizer coils L101, L201, L301 and L401 so that the VTVM indicates the same output level between the two signals.

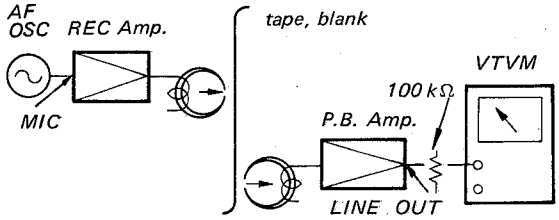


Fig. 9-18 Record equalizer adjustment setup

9-14. Overall Frequency Response, S/N Ratio and Distortion Measurements

Adjustment Procedure:

(1) Connect an AF Oscillator to the MIC jack and a VTVM to the LINE OUT jack.
(2) Set the MONITOR switch to the TAPE position and the MIC VOLUME control to the specified position in the preparation (2).
(3) Deliver a 1 kHz signal of -90 dB (24.5 μV) into the MIC jack from the AF Oscillator.
(4) Record the signal on a blank tape and memorize the VTVM reading.
(5) Deliver 50 Hz, 100 Hz, 5 kHz, 7 kHz, 12.5 kHz and 18 kHz signals in turn and record them on the blank tape and memorize the VTVM readings respectively.
(6) Be sure that each deviation in level against 1 kHz signal is within the values shown in the following table at the tape speeds of 19 cm/s and 9.5 cm/s. If not, perform the record equalizer and the record bias adjustments.

Deviation against the 1 kHz signal

frequency / tape speed	50 Hz	100 Hz	5 kHz	7 kHz	12.5 kHz	18 kHz
19 cm/s (7½ ips)	$^{+2}_{-4}$ dB	± 3 dB	± 3 dB	± 3 dB	± 3 dB	$^{+3}_{-6}$ dB
9.5 cm/s (3¾ ips)	$^{+3}_{-8}$ dB	± 3 dB	± 3 dB	± 3 dB	$^{+3}_{-12}$ dB	–

(7) Deliver a 1 kHz signal of -60 dB (0.775 mV) into the MIC jack from the AF Oscillator.
(8) Record the signal on a blank tape.
(9) Rewind the recorded tape, terminate the four MIC jack with a 600Ω resistor and erase a part of the recorded tape (record mode with no signal input).
(10) Be sure that the output level difference between the two parts is more than 46 dB on the VTVM.
(11) Disconnect the VTVM.
(12) Connect a distortion meter to the LINE OUT jack.
(13) Record the 1 kHz signal of -60 dB (0.775 mV) and play back the signal.
(14) Be sure that the reading on the distortion meter is less than 1.5%.

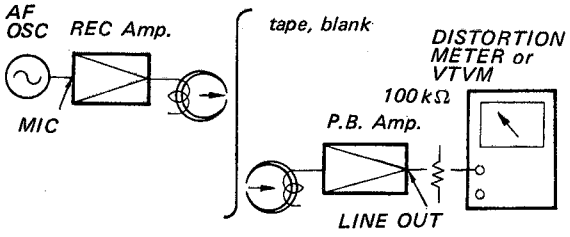


Fig. 9-19 Overall frequency response, S/N ratio and distortion measurements setup

9-15. Dummy Coil Adjustment

Adjustment Procedure:

(1) Connect an AF Oscillator to the MIC jack and a VTVM to the LINE OUT jack.
(2) Set the MONITOR switch to the TAPE position and the MIC VOLUME control to the specified position in the preparation (2).
(3) Deliver a 18 kHz signal of -80 dB (77.5 μV) into the MIC jack from the AF Oscillator.
(4) Thread a blank tape and place the machine in 4-channel stereo record mode.
(5) Memorize the VTVM reading.
(6) Set the FRONT channel only in the record mode.
(7) Adjust L504 with a non-magnetic screwdriver so that the VTVM reading is the same as the reading memorized in preceding step 5.
(8) Reset the REAR channel only in the record mode.
(9) Adjust L503 with a non-magnetic screwdriver so that the VTVM reading is the same as the reading memorized in preceding step 5.

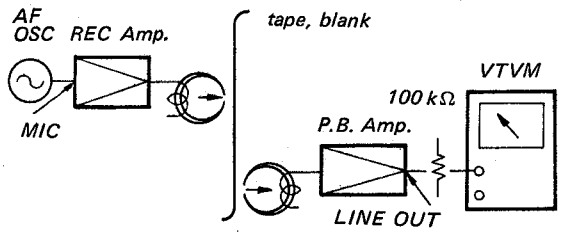


Fig. 9-20 Dummy coil adjustment setup

9-16. Erase Ratio Measurement

Adjustment Procedure:

(1) Connect an AF Oscillator to the MIC jack.
(2) Connect a VTVM to the LINE OUT jack through a band pass filter (BPF).
(3) Set the MONITOR switch to the TAPE position and the MIC VOLUME control to the specified position in the preparation (2).
(4) Deliver a 333 Hz signal of -50 dB (2.45 mV) into the MIC jack.
(5) Thread a blank tape and place the machine in the 2-channel stereo record mode (FRONT).
(6) Rewind the half parts of tape, terminate the four MIC jack with a 600Ω resistor and continue the recording (record mode with no signal input).
(7) Play back the recorded part and the erased part of the tape.
(8) Memorize the VTVM reading on the recorded part and the erased part of the tape.
(9) Be sure that the output level difference between the two parts is more than 65 dB on the VTVM.

Note: In this measurement, the level variation should be within 5 dB. If not, perform the tape path adjustment.

(10) Perform the above steps for other 2-channels (REAR).

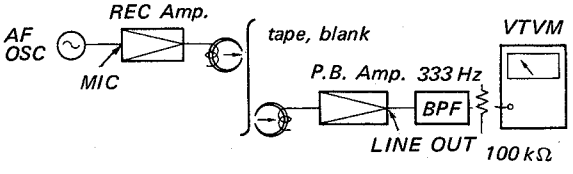
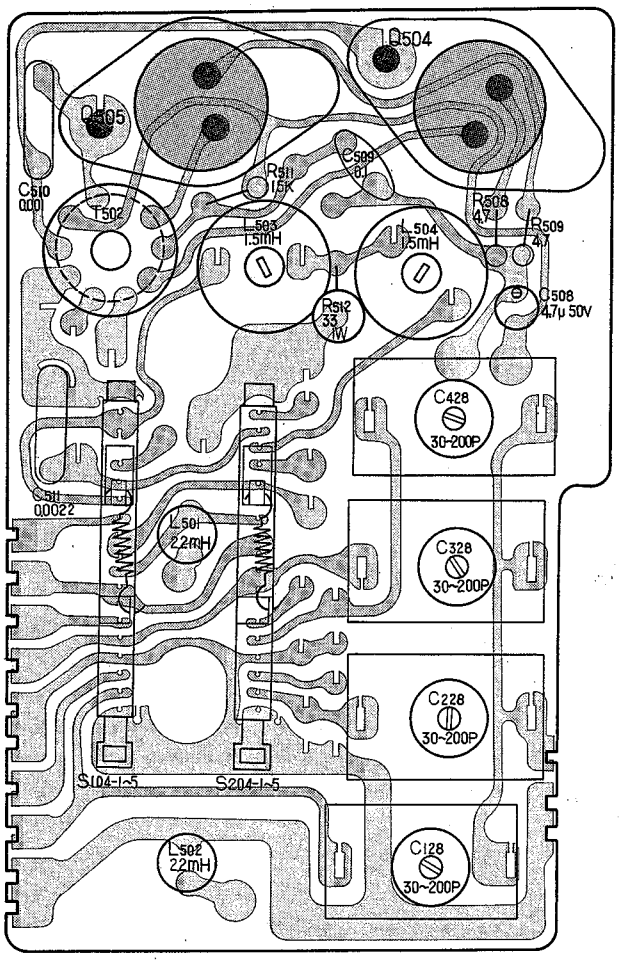


Fig. 9-21 Erase ratio measurement setup

10. MOUNTING DIAGRAM

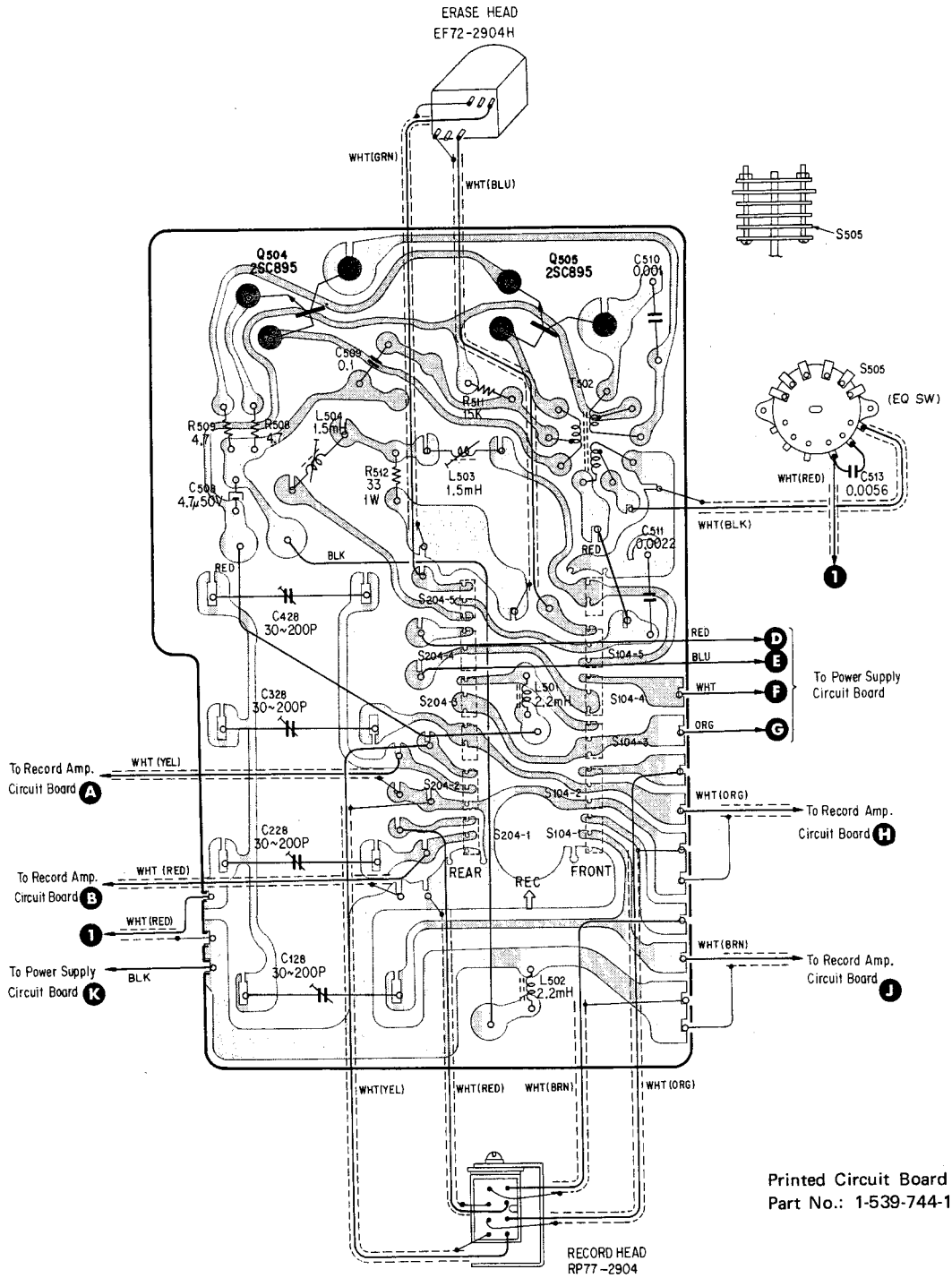
10-1. Bias OSC Circuit Board

– Component Side –



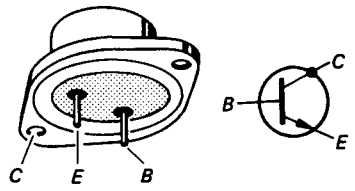
10-1. Bias OSC Circuit Board

– Conductor Side –



Printed Circuit Board
Part No.: 1-539-744-11

2SC895

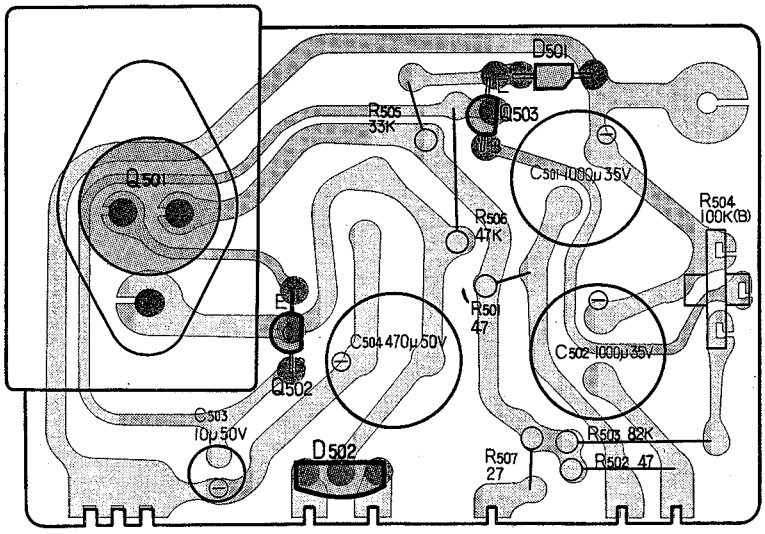


Adjusting Parts:

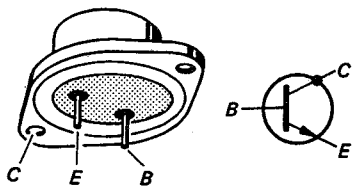
- C128, 228, 328, 428
  (for Record Bias Adjustment)
- L503, 504
  (for Dummy Coil Adjustment)

10-2. Power Supply Circuit Board

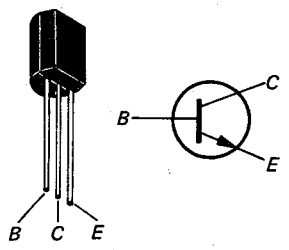
– Component Side –



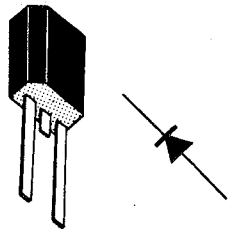
2SD28



2SC870

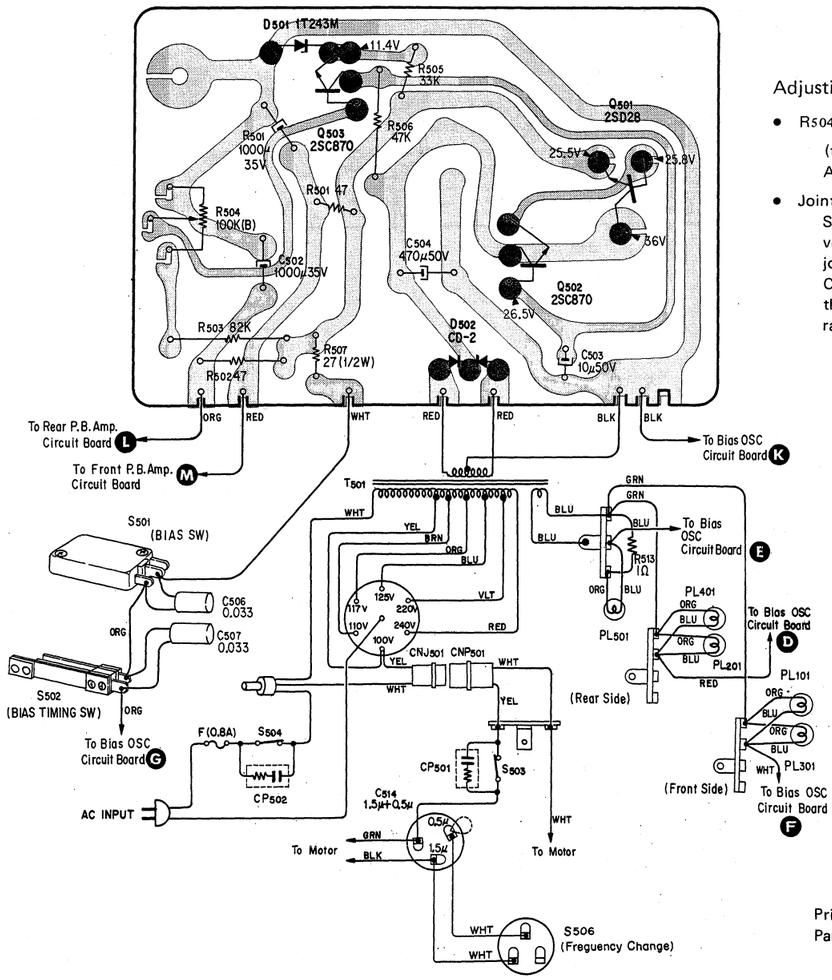


1T243M



10-2. Power Supply Circuit Board

– Conductor Side –



Adjusting Parts:

- R504

  (for Power Supply Voltage Adjustment)

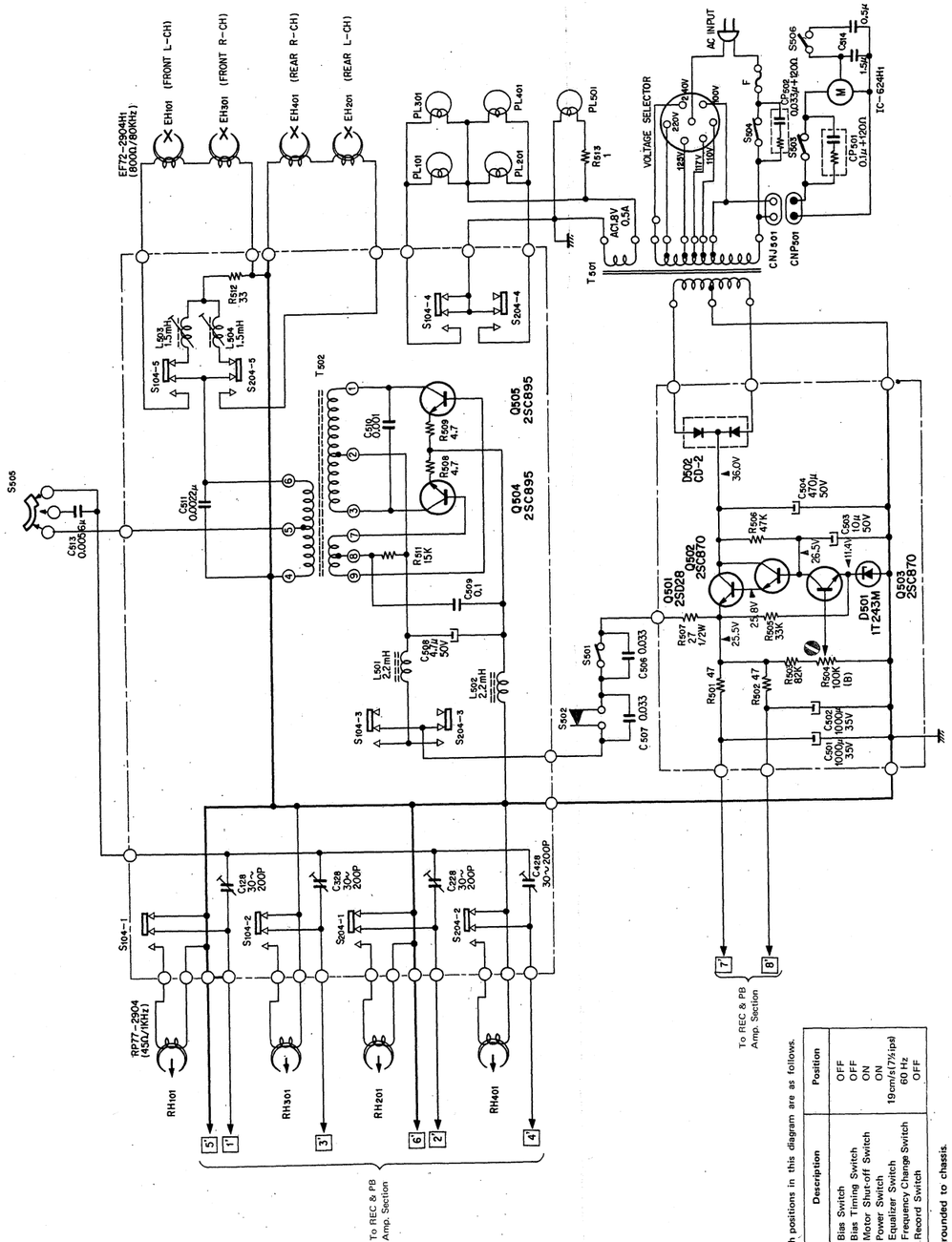
- Joint Terminal

  S/N ratio will change by reversing the connection of the joint terminal CNP501 for CNJ501. Therefore connect them to obtain better S/N ratio.

Printed Circuit Board
Part No.: 1-539-745-11

11. SCHEMATIC DIAGRAM

11-1. Bias OSC & Power Supply Section



Notes:

(1) The switch positions in this diagram are as follows.

Switch No.	Description	Position
S501	Bias Switch	OFF
S502	Bias Timing Switch	OFF
S503	Motor Shut-off Switch	ON
S504	Power Switch	ON
S505	Equalizer Switch	19cm/s(7½ips)
S506	Frequency Change Switch	60 Hz
S104, 204	Record Switch	OFF

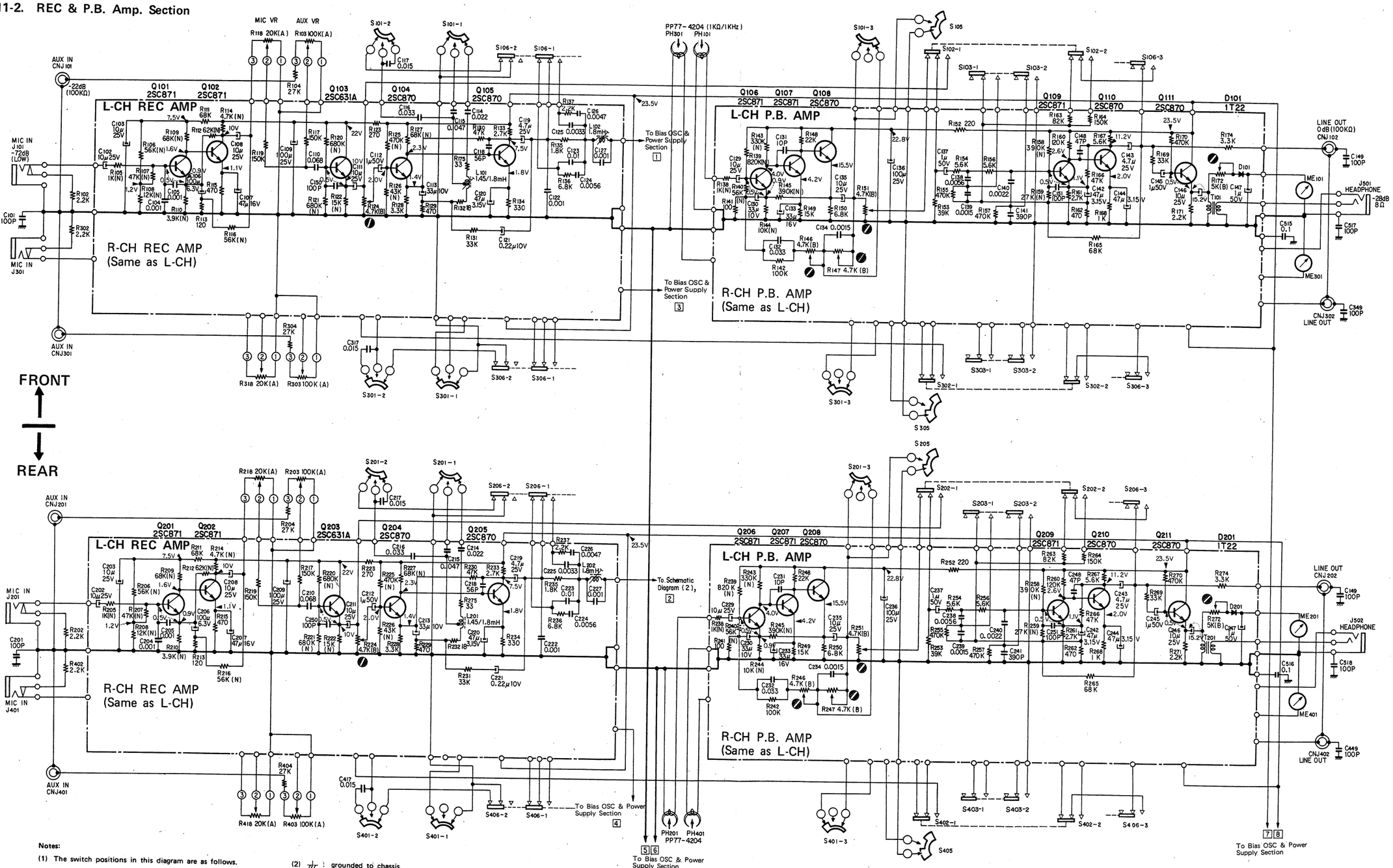
(2) ⏚ : grounded to chassis.

(3) ⊘ : indicates the semi-fixed resistor.

(4) The letter (B) which is suffixed to the rating value of the resistor indicates its characteristic.

(5) Voltage values are measured by using a voltmeter (20kΩ/V) in playback mode with no signal input.

11-2. REC & P.B. Amp. Section



Notes:

(1) The switch positions in this diagram are as follows.

Switch No.	Description	Position
S101, 201, 301, 401	Equalizer Switch	19cm/s(7½ ips)
S102, 202, 302, 402	Monitor Switch	TAPE
S103, 203, 303, 403	Noise Suppress Switch	OFF
S105, 205, 305, 405	Muting Switch	OFF
S106, 206, 306, 406	Tape Selector Switch	NORMAL

(2) ⏚ : grounded to chassis.

(3) ⊘ : indicates the semi-fixed resistor.

(4) The letters (A) and (B) which are suffixed to the rating value of the resistor indicate its characteristic.

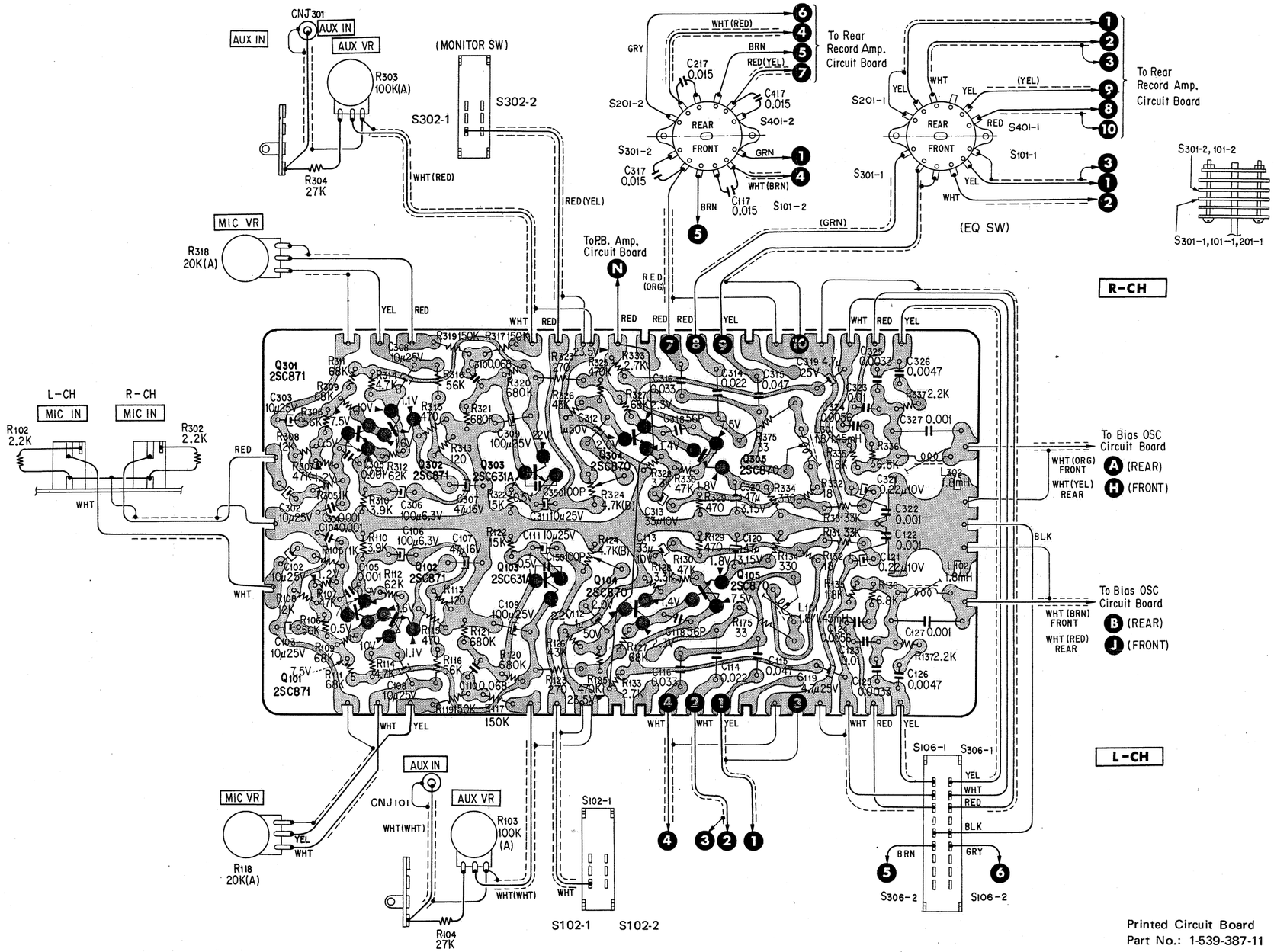
(5) The resistor whose rating value is suffixed with the letter (N) is a low-noise resistor.

(6) Voltage values are measured by using a voltmeter (20 kΩ/V) in playback mode with no signal input.

10. MOUNTING DIAGRAM

10-3. REC Amp. Circuit Board – FRONT –

– Conductor Side –



Printed Circuit Board
Part No.: 1-539-387-11

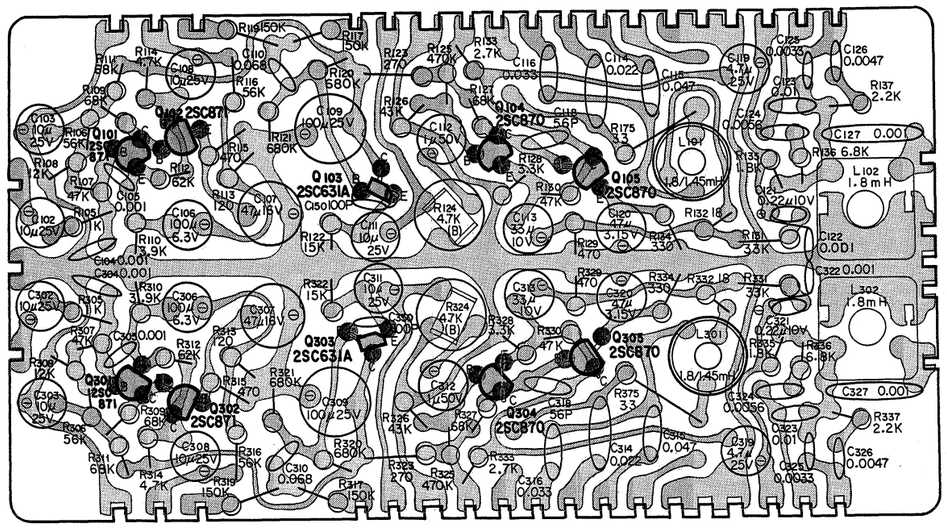
Adjusting Parts:

- R124, 224, 324, 424
  (for Record Level Adjustment)
- L101, 201, 301, 401
  (for Record Equalizer Adjustment)
- L102, 202, 302, 402
  (for Trap Coil Adjustment)

Note: REAR Amp. Circuit Board is the same as FRONT one.

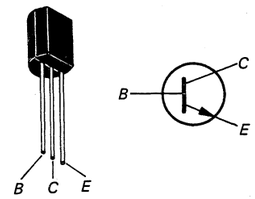
10-3. REC Amp. Circuit Board

– Component Side –

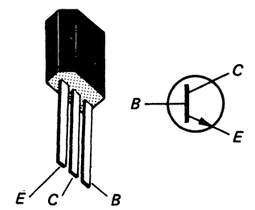


Note: REAR Amp. Circuit Board is the same as FRONT one.

2SC870, 2SC871

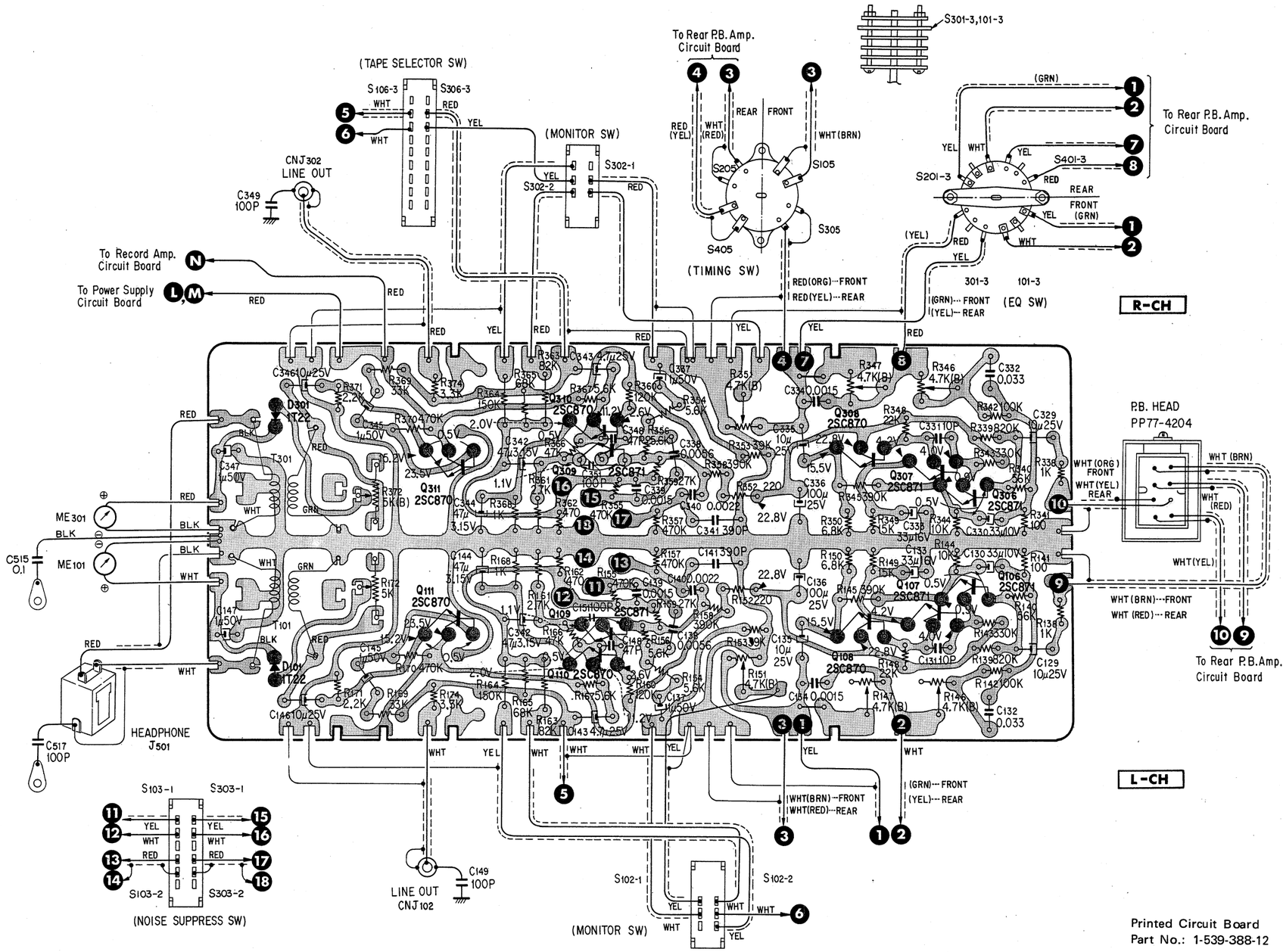


2SC631A



10-4. P.B. Amp. Circuit Board – FRONT –

– Conductor Side –



Adjusting Parts:

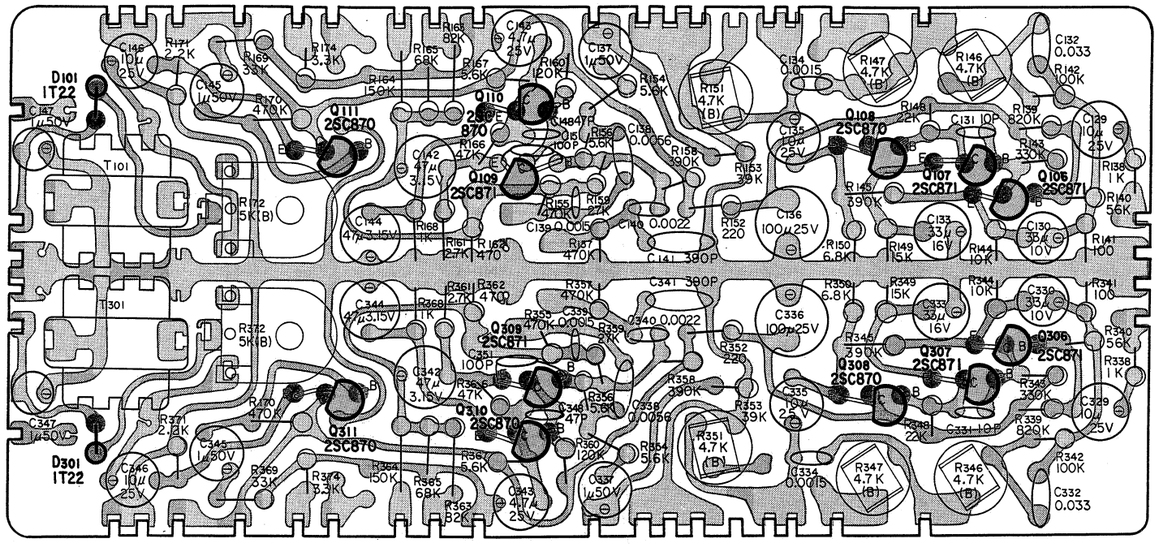
- R146, 246, 346, 446
  (for 19 cm/s P.B. Equalizer Adjustment)
- R147, 247, 347, 447
  (for 9.5 cm/s P.B. Equalizer Adjustment)
- R151, 251, 351, 451
  (for P.B. Output Level Adjustment)
- R172, 272, 372, 472
  (for Level Meter Calibration)

Note: REAR Amp. Circuit Board is the same as FRONT one.

Printed Circuit Board
Part No.: 1-539-388-12

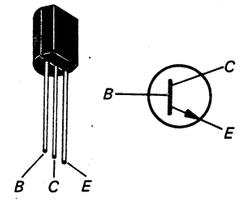
10-4. P.B. Amp. Circuit Board

– Component Side –

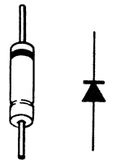


Note: REAR Amp. Circuit Board is the same as FRONT one.

2SC870, 2SC871



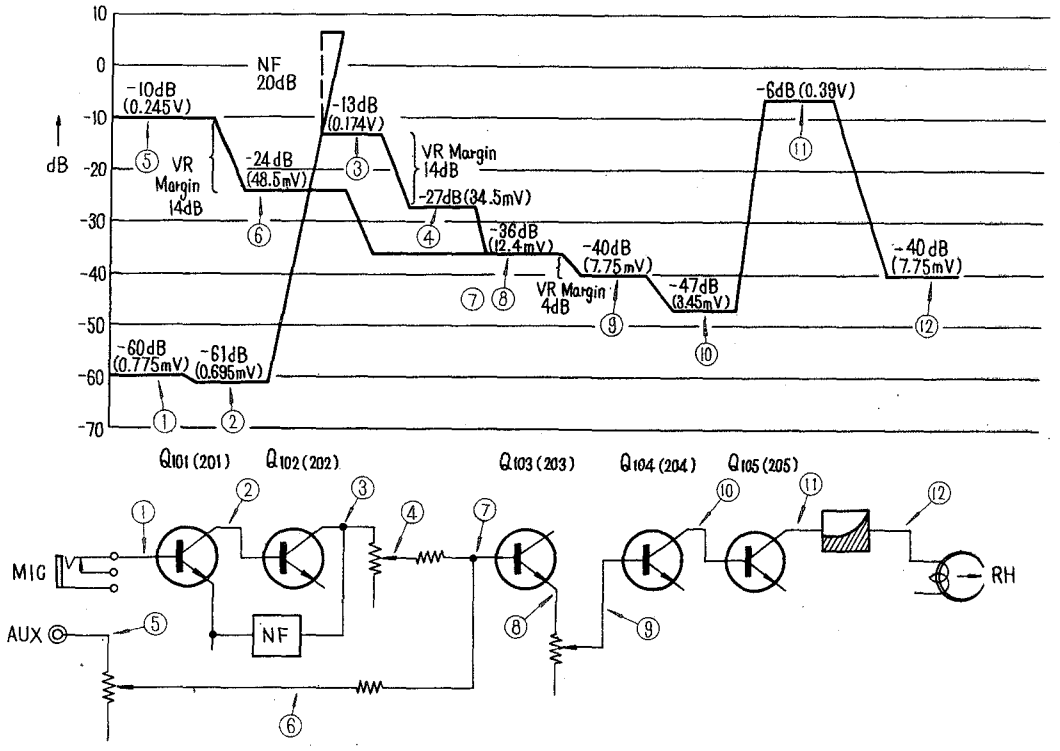
1T22



12. LEVEL DIAGRAM

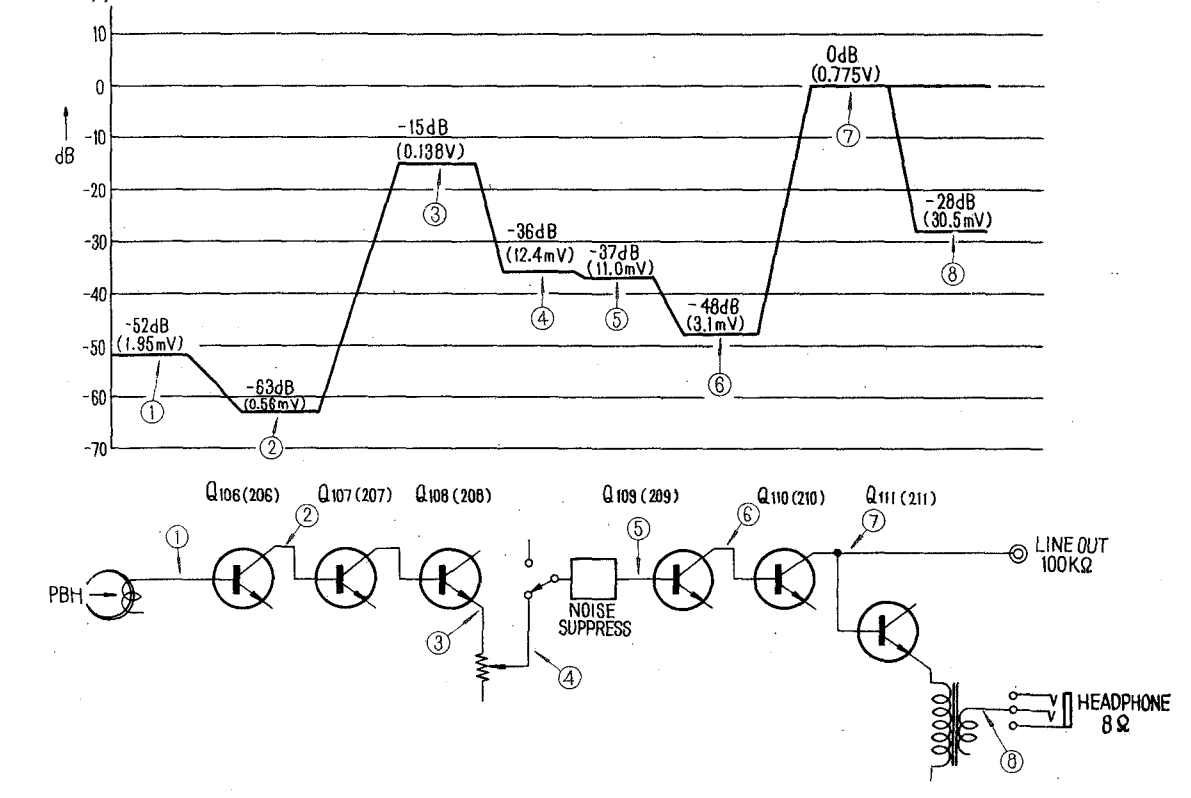
12-1. Record

0dB = 0.775V, f = 1kHz



12-2. Playback

0dB = 0.775V, f = 1kHz



13. ELECTRICAL PARTS LIST

Ref. No.	Part No.	Description
	MOUNTED CIRCUIT BOARDS	
	X-34840-51-1	record amp.
	X-34840-52-1	power supply
	X-34840-53-1	playback amp.
	X-34840-54-1	bias osc.
	PRINTED CIRCUIT BOARDS	
	1-539-387-11	record amp.
	1-539-388-12	playback amp.
	1-539-744-11	bias osc.
	1-539-745-11	power supply
	SEMICONDUCTORS	
Q101, 201 Q301, 401		transistor 2SC871
Q102, 202 Q302, 402		transistor 2SC871
Q103, 203 Q303, 403		transistor 2SC631A
Q104, 204 Q304, 404		transistor 2SC870
Q105, 205 Q305, 405		transistor 2SC870
Q106, 206 Q306, 406		transistor 2SC871
Q107, 207 Q307, 407		transistor 2SC871
Q108, 208 Q308, 408		transistor 2SC870
Q109, 209 Q309, 409		transistor 2SC871
Q110, 210 Q310, 410		transistor 2SC870
Q111, 211 Q311, 411		transistor 2SC870
Q501		transistor 2SD28
Q502		transistor 2SC870
Q503		transistor 2SC870
Q504		transistor 2SC895
Q505		transistor 2SC895
D101, 201 D301, 401		diode, 1T22
D501		diode, 1T243M
D502		diode, CD-2
	COILS	
L101, 201 L301, 401	1-231-069	equalizer, 1.8/1.45 mH
L102, 202 L302, 402	1-409-141	trap, 1.8 mH
L501	1-407-198-21	micro inductor
L502	1-407-198-21	micro inductor
L503	1-407-285	dummy
L504	1-407-285	dummy

Ref. No.	Part No.	Description
	TRANSFORMERS	
T101, 201 T301, 401	1-427-217	output
T501	1-441-714	power
T502	1-433-149	bias osc.
	CAPACITORS	
C101, 201 C301, 401	1-107-131	100pF 50V silvered mica
C102, 202 C302, 402	1-121-748	10μF 25V electrolytic
C103, 203 C303, 403	1-121-398	10μF 25V electrolytic
C104, 204 C304, 404	1-105-821-12	0.001μF 50V mylar
C105, 205 C305, 405	1-105-821-12	0.001μF 50V mylar
C106, 206 C306, 406	1-121-413	100μF 6.3V electrolytic
C107, 207 C307, 407	1-121-409	47μF 16V electrolytic
C108, 208 C308, 408	1-121-398	10μF 25V electrolytic
C109, 209 C309, 409	1-121-416	100μF 25V electrolytic
C110, 210 C310, 410	1-105-843-12	0.068μF 50V mylar
C111, 211 C311, 411	1-121-398	10μF 25V electrolytic
C112, 212 C312, 412	1-121-391	1μF 50V electrolytic
C113, 213 C313, 413	1-121-402	33μF 10V electrolytic
C114, 214 C314, 414	1-105-677-12	0.022μF 50V mylar
C115, 215 C315, 415	1-105-681-12	0.047μF 50V mylar
C116, 216 C316, 416	1-105-679-12	0.033μF 50V mylar
C117, 217 C317, 417	1-105-675-12	0.015μF 50V mylar
C118, 218 C318, 418	1-107-125	56pF 50V silvered mica
C119, 219 C319, 419	1-121-395	4.7μF 25V electrolytic
C120, 220 C320, 420	1-121-406	47μF 3.15V electrolytic
C121, 221 C321, 421	1-127-020	0.22μF 10V electrolytic
C122, 222 C322, 422	1-105-821-12	0.001μF 50V mylar
C123, 223 C323, 423	1-105-673-12	0.01μF 50V mylar
C124, 224 C324, 424	1-105-670-12	0.0056μF 50V mylar
C125, 225 C325, 425	1-105-667-12	0.0033μF 50V mylar

Ref. No.	Part No.	Description		
C126, 226, C326, 426	1-105-669-12	0.0047μF	50V	mylar
C127, 227, C327, 427	1-129-702	0.001μF	630V	polyethylene
C128, 228, C328, 428	1-141-010	30～200pF		trimmer
C129, 229, C329, 429	1-121-748	10μF	25V	electrolytic
C130, 230, C330, 430	1-121-402	33μF	10V	electrolytic
C131, 231, C331, 431	1-107-107	10pF	50V	silvered mica
C132, 232, C332, 432	1-105-679-12	0.033μF	50V	mylar
C133, 233, C333, 433	1-121-403	33μF	16V	electrolytic
C134, 234, C334, 434	1-105-663-12	0.0015μF	50V	mylar
C135, 235, C335, 435	1-121-398	10μF	25V	electrolytic
C136, 236, C336, 436	1-121-416	100μF	25V	electrolytic
C137, 237, C337, 437	1-121-391	1μF	50V	electrolytic
C138, 238, C338, 438	1-105-670-12	0.0056μF	50V	mylar
C139, 239, C339, 439	1-105-663-12	0.0015μF	50V	mylar
C140, 240, C340, 440	1-105-665-12	0.0022μF	50V	mylar
C141, 241, C341, 441	1-107-242	390pF	50V	silvered mica
C142, 242, C342, 442	1-121-406	47μF	3.15V	electrolytic
C143, 243, C343, 443	1-121-395	4.7μF	25V	electrolytic
C144, 244, C344, 444	1-121-406	47μF	3.15V	electrolytic
C145, 245, C345, 445	1-121-391	1μF	50V	electrolytic
C146, 246, C346, 446	1-121-398	10μF	25V	electrolytic
C147, 247, C347, 447	1-121-391	1μF	50V	electrolytic
C148, 248, C348, 448	1-107-123	47pF	50V	silvered mica
C149, 249, C349, 449	1-107-131	100pF	50V	silvered mica
C150, 250, C350, 450	1-102-106	100pF	50V	ceramic
C151, 251, C351, 451	1-102-106	100pF	50V	ceramic
C501	1-121-388	1,000μF	35V	electrolytic
C502	1-121-388	1,000μF	35V	electrolytic
C503	1-121-738	10μF	50V	electrolytic
C504	1-121-810	470μF	50V	electrolytic
C505		– discarded –		
C506	1-105-759-12	0.033μF	200V	mylar
C507	1-105-759-12	0.033μF	200V	mylar
C508	1-121-396	4.7μF	50V	electrolytic
C509	1-105-845-12	0.1μF	50V	mylar
C510	1-129-702	0.001μF	630V	polyethylene
C511	1-129-706	0.0022μF	630V	polyethylene
C512		– discarded –		
C513	1-129-711	0.0056μF	630V	polyethylene
C514	1-117-036	1.5+0.5μF	250V	MP
C515	1-105-845-12	0.1μF	50V	mylar
C516	1-105-845-12	0.1μF	50V	mylar
C517	1-107-131	100pF	50V	silvered mica
C518	1-107-131	100pF	50V	silvered mica

RESISTORS

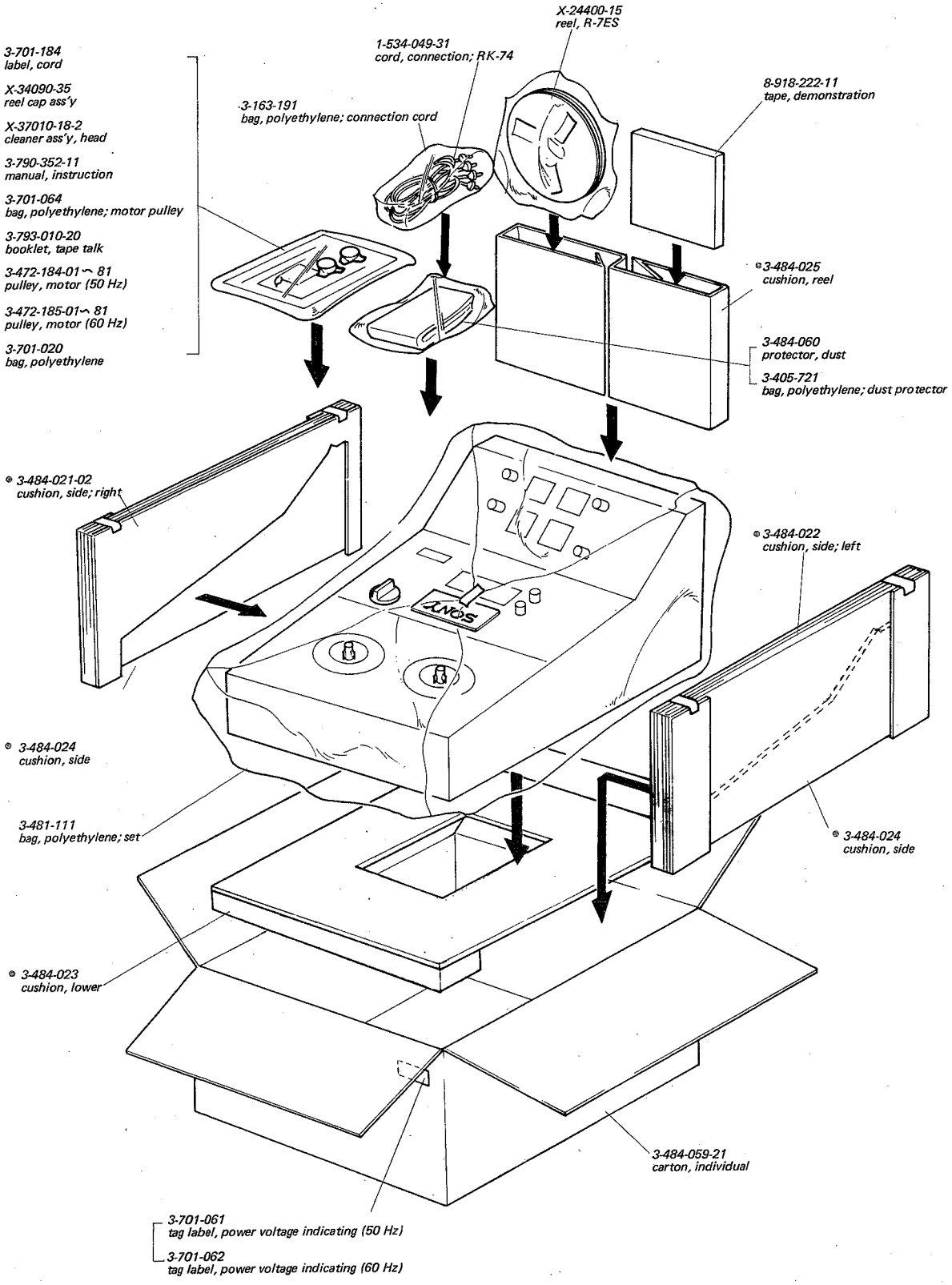
R101, 201, R301, 401		– discarded –		
R102, 202, R302, 402	1-244-681	2.2kΩ	¼W	carbon
R103, 203, R303, 403	1-222-305	100kΩ (A)		variable; AUX
R104, 204, R304, 404	1-244-707	27kΩ	¼W	carbon
R105, 205, R305, 405	1-242-673	1kΩ	¼W	carbon (low-noise)
R106, 206, R306, 406	1-242-715	56kΩ	¼W	carbon (low-noise)
R107, 207, R307, 407	1-242-713	47kΩ	¼W	carbon (low-noise)
R108, 208, R308, 408	1-242-699	12kΩ	¼W	carbon (low-noise)
R109, 209, R309, 409	1-242-717	68kΩ	¼W	carbon (low-noise)
R110, 210, R310, 410	1-242-687	3.9kΩ	¼W	carbon (low-noise)
R111, 211, R311, 411	1-242-717	68kΩ	¼W	carbon (low-noise)
R112, 212, R312, 412	1-242-716	62kΩ	¼W	carbon (low-noise)
R113, 213, R313, 413	1-242-651	120Ω	¼W	carbon
R114, 214, R314, 414	1-242-689	4.7kΩ	¼W	carbon (low-noise)
R115, 215, R315, 415	1-242-665	470Ω	¼W	carbon
R116, 216, R316, 416	1-242-715	56kΩ	¼W	carbon (low-noise)
R117, 217, R317, 417	1-242-725	150kΩ	¼W	carbon
R118, 218, R318, 418	1-222-306	20kΩ (A)		variable; MIC
R119, 219, R319, 419	1-242-725	150kΩ	¼W	carbon
R120, 220, R320, 420	1-242-741	680kΩ	¼W	carbon (low-noise)
R121, 221, R321, 421	1-242-741	680kΩ	¼W	carbon (low-noise)

Ref. No.	Part No.	Description		
R122, 222 R322, 422	1-242-701	15 kΩ	¼W	carbon (low-noise)
R123, 223 R323, 423	1-242-659	270 Ω	¼W	carbon
R124, 224 R324, 424	1-221-978	4.7 kΩ (B)		semi-fixed
R125, 225 R325, 425	1-242-737	470 kΩ	¼W	carbon (low-noise)
R126, 226 R326, 426	1-242-712	43 kΩ	¼W	carbon (low-noise)
R127, 227 R327, 427	1-242-717	68 kΩ	¼W	carbon (low-noise)
R128, 228 R328, 428	1-242-685	4.7 kΩ	¼W	carbon
R129, 229 R329, 429	1-242-665	470 Ω	¼W	carbon
R130, 230 R330, 430	1-242-713	47 kΩ	¼W	carbon
R131, 231 R331, 431	1-242-709	33 kΩ	¼W	carbon
R132, 232 R332, 432	1-242-631	18 Ω	¼W	carbon
R133, 233 R333, 433	1-242-683	2.7 kΩ	¼W	carbon
R134, 234 R334, 434	1-242-661	330 Ω	¼W	carbon
R135, 235 R335, 435	1-242-679	1.8 kΩ	¼W	carbon
R136, 236 R336, 436	1-242-693	6.8 kΩ	¼W	carbon
R137, 237 R337, 437	1-242-681	2.2 kΩ	¼W	carbon
R138, 238 R338, 438	1-242-673	1 kΩ	¼W	carbon (low-noise)
R139, 239 R339, 439	1-242-743	820 kΩ	¼W	carbon (low-noise)
R140, 240 R340, 440	1-242-715	56 kΩ	¼W	carbon (low-noise)
R141, 241 R341, 441	1-242-649	100 Ω	¼W	carbon
R142, 242 R342, 442	1-242-721	100 kΩ	¼W	carbon
R143, 243 R343, 443	1-242-733	330 kΩ	¼W	carbon (low-noise)
R144, 244 R344, 444	1-242-697	10 kΩ	¼W	carbon (low-noise)
R145, 245 R345, 445	1-242-735	390 kΩ	¼W	carbon (low-noise)
R146, 246 R346, 446	1-221-978	4.7 kΩ (B)		semi-fixed
R147, 247 R347, 447	1-221-978	4.7 kΩ (B)		semi-fixed
R148, 248 R348, 448	1-242-705	22 kΩ	¼W	carbon
R149, 249 R349, 449	1-242-701	15 kΩ	¼W	carbon
R150, 250 R350, 450	1-242-693	6.8 kΩ	¼W	carbon
R151, 251 R351, 451	1-221-978	4.7 kΩ (B)		semi-fixed
R152, 252 R352, 452	1-242-657	220 Ω	¼W	carbon
R153, 253 R353, 453	1-242-711	39 kΩ	¼W	carbon
R154, 254 R354, 454	1-242-691	5.6 kΩ	¼W	carbon
R155, 255 R355, 455	1-242-737	470 kΩ	¼W	carbon
R156, 256 R356, 456	1-242-691	5.6 kΩ	¼W	carbon
R157, 257 R357, 457	1-242-737	470 kΩ	¼W	carbon
R158, 258 R358, 458	1-242-735	390 kΩ	¼W	carbon (low-noise)
R159, 259 R359, 459	1-242-707	27 kΩ	¼W	carbon (low-noise)
R160, 260 R360, 460	1-242-723	120 kΩ	¼W	carbon
R161, 261 R361, 461	1-242-683	2.7 kΩ	¼W	carbon
R162, 262 R362, 462	1-242-665	470 Ω	¼W	carbon
R163, 263 R363, 463	1-242-719	82 kΩ	¼W	carbon
R164, 264 R364, 464	1-242-725	150 kΩ	¼W	carbon
R165, 265 R365, 465	1-242-717	68 kΩ	¼W	carbon
R166, 266 R366, 466	1-242-713	47 kΩ	¼W	carbon
R167, 267 R367, 467	1-242-691	5.6 kΩ	¼W	carbon
R168, 268 R368, 468	1-242-673	1 kΩ	¼W	carbon
R169, 269 R369, 469	1-242-709	33 kΩ	¼W	carbon
R170, 270 R370, 470	1-242-737	470 kΩ	¼W	carbon
R171, 271 R371, 471	1-242-681	2.2 kΩ	¼W	carbon
R172, 272 R372, 472	1-221-748	5 kΩ (B)		semi-fixed
R173, 273 R373, 473		– discarded –		
R174, 274 R374, 474	1-242-685	3.3 kΩ	¼W	carbon
R175, 275 R375, 475	1-242-637	33 Ω	¼W	carbon
R501	1-242-641	47 Ω	¼W	carbon
R502	1-242-641	47 Ω	¼W	carbon
R503	1-242-719	82 kΩ	¼W	carbon
R504	1-221-664	100 kΩ (B)		semi-fixed
R505	1-242-709	33 kΩ	¼W	carbon
R506	1-242-713	47 kΩ	¼W	carbon
R507	1-244-835	27 Ω	½W	carbon

Ref. No.	Part No.	Description
R508	1-242-617	4.7Ω ¼W carbon
R509	1-242-617	4.7Ω ¼W carbon
R510		– discarded –
R511	1-202-411	15kΩ ¼W composition
R512	1-202-258	33Ω 1W composition
R513	1-244-601	1Ω ¼W carbon
		JACKS
J101, 201, J301, 401	1-507-251	miniature; MIC
J501	1-507-282	binaural; HEADPHONE
J502	1-507-282	binaural; HEADPHONE
CNJ101, CNJ201, CNJ301, CNJ401	1-507-142	phono, 2-p; AUX IN
CNJ102, CNJ202, CNJ302, CNJ402	1-507-142	phono, 2-p; LINE OUT
CNJ501	1-507-323	connector (JACK)
CNP501	1-506-312	connector (PLUG)
		SWITCHES
S101, 201, S301, 401	1-514-771	rotary; EQUALIZER
D102, 202, D302, 402	1-514-640	toggle; MONITOR
S103, 203, S303, 403	1-514-641	toggle; NOISE SUPPRESS
S104, 204	1-514-453-21	slide; RECORD
S105, 205, S305, 405	1-514-773	rotary; wafer; MUTING
S106, 206, S306, 406	1-514-642	toggle; TAPE SELECTOR
S501	1-514-231	micro; BIAS ON/OFF
S502	1-514-041	leaf; BIAS timing
S503	1 514-039	micro; MOTOR
S504	1-514-655-11	seesaw; POWER ON/OFF
S505	1-514-771	rotary; EQUALIZER
S506	1-514-512	rotary; frequency change
		HEADS
RH101, 201, RH301, 401	8-824-509-40	record (RP77-2904)
PH101, 201, PH301, 401	8-822-542-40	playback (PP77-4204)
EH101, 201, EH301, 401	8-825-501-00	erase (EF72-2904H1)
		LAMPS
PL101, 201, PL301, 401	1-518-093-21	record, 100mA
PL501	1-518-093-21	power, 100mA
		ENCAPSULATED COMPONENTS C-R
CP501	1-101-534	0.1μF + 120Ω
CP502	1-231-057	0.033μF + 120Ω
		MISCELLANEOUS
ME101, 201, ME301, 401	1-524-062	meter, level
M	8-832-624-09	motor (IC-624H1)
	1-534-487-22	cord, power
	1-535-506	terminal; joint
	1-536-146	terminal strip; 1-L-1
	1-536-179	terminal strip; 1-L-1
	1-536-180	terminal strip; 1-L-2
	1-536-181	terminal strip; 2-L-1
F	1-532-096	fuse, 0.8A
	1-533-006	holder, fuse
	1-509-064	switch, voltage selector

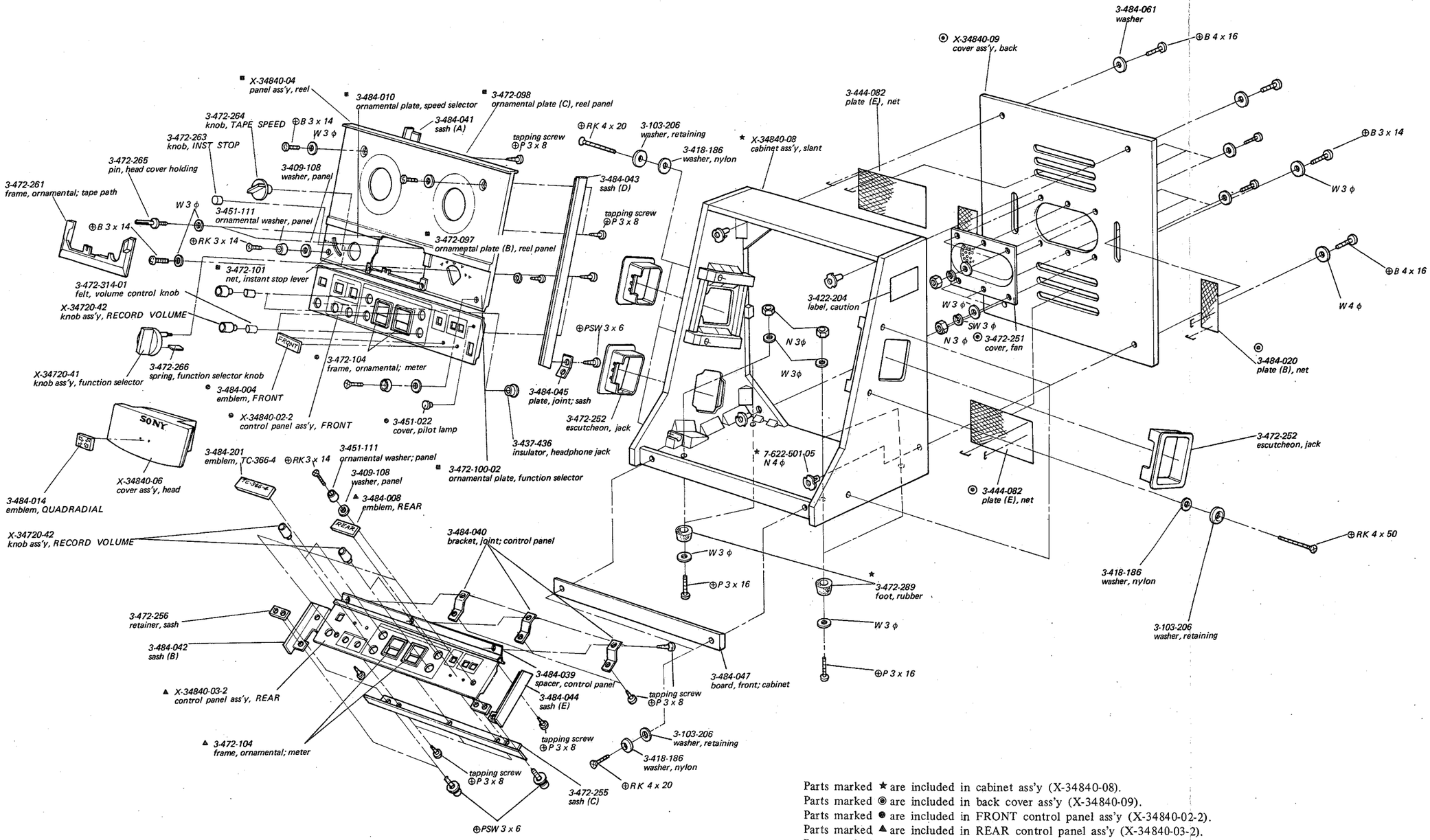
14. EXPLODED VIEW

14-1. Packing



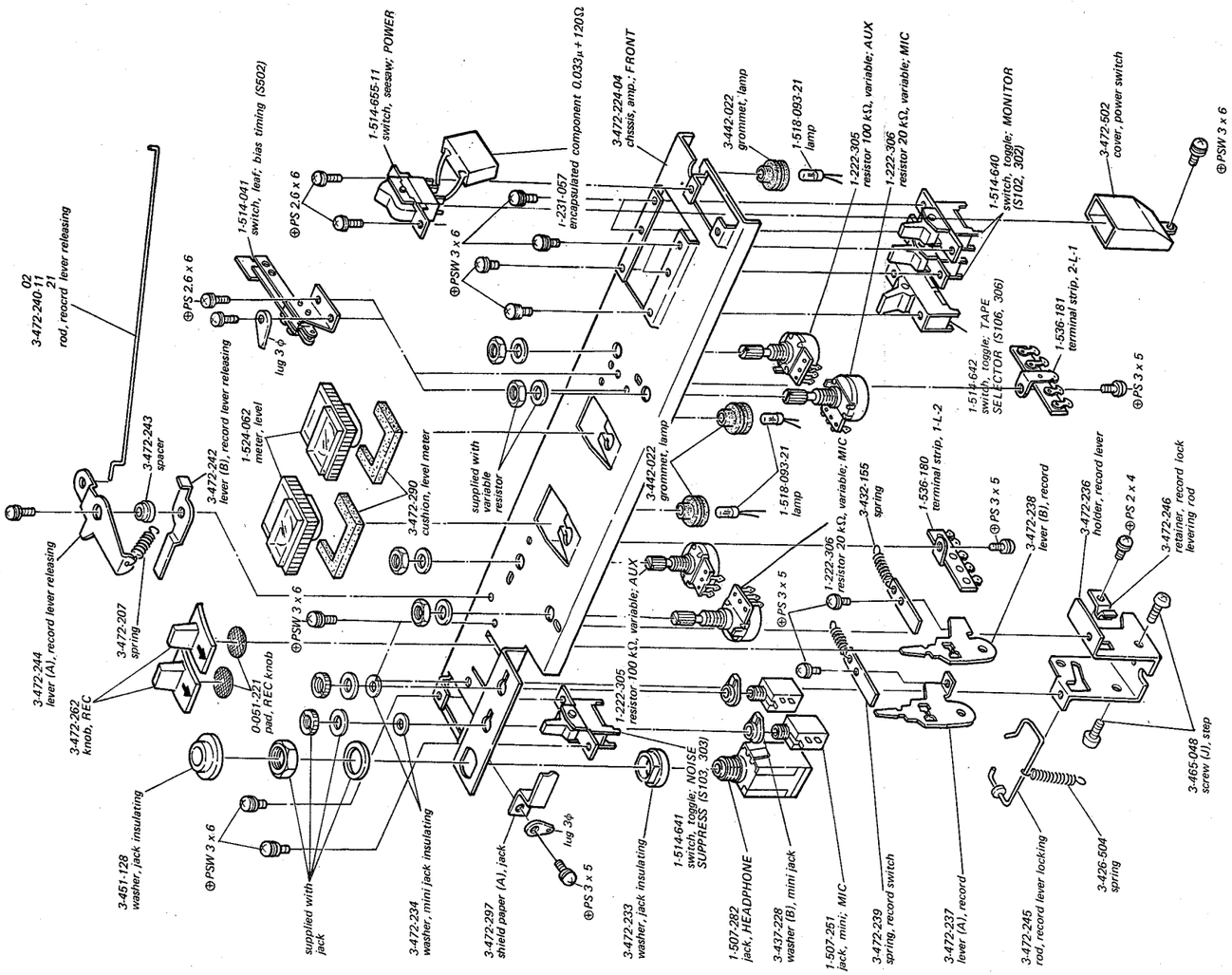
Parts marked ⊛ are included in cushion ass'y (X-34840-10).

14-2. Cabinet — top view —

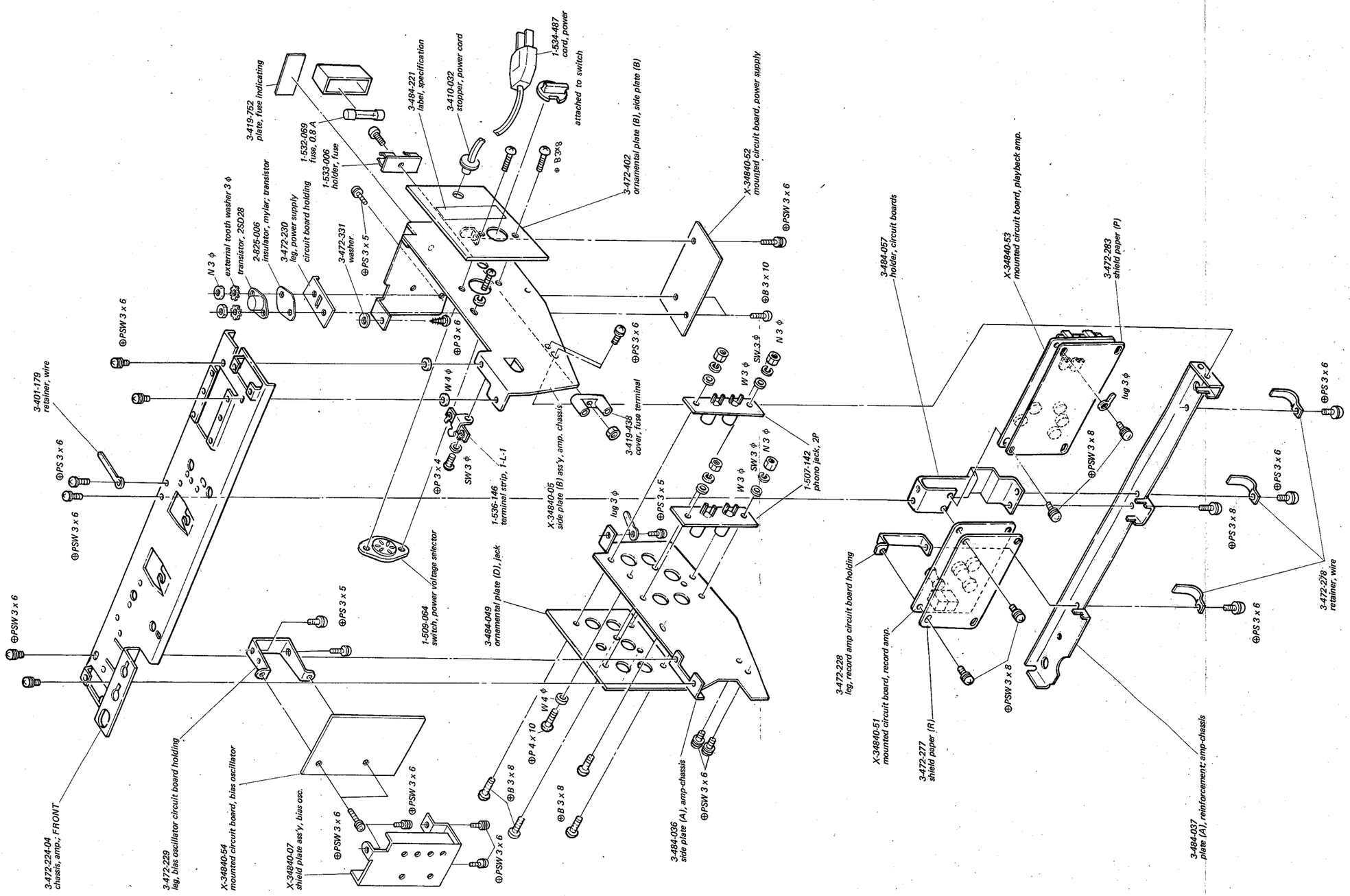


Parts marked ★ are included in cabinet ass'y (X-34840-08).
Parts marked ◉ are included in back cover ass'y (X-34840-09).
Parts marked ● are included in FRONT control panel ass'y (X-34840-02-2).
Parts marked ▲ are included in REAR control panel ass'y (X-34840-03-2).
Parts marked ■ are included in reel panel ass'y (X-34840-04).

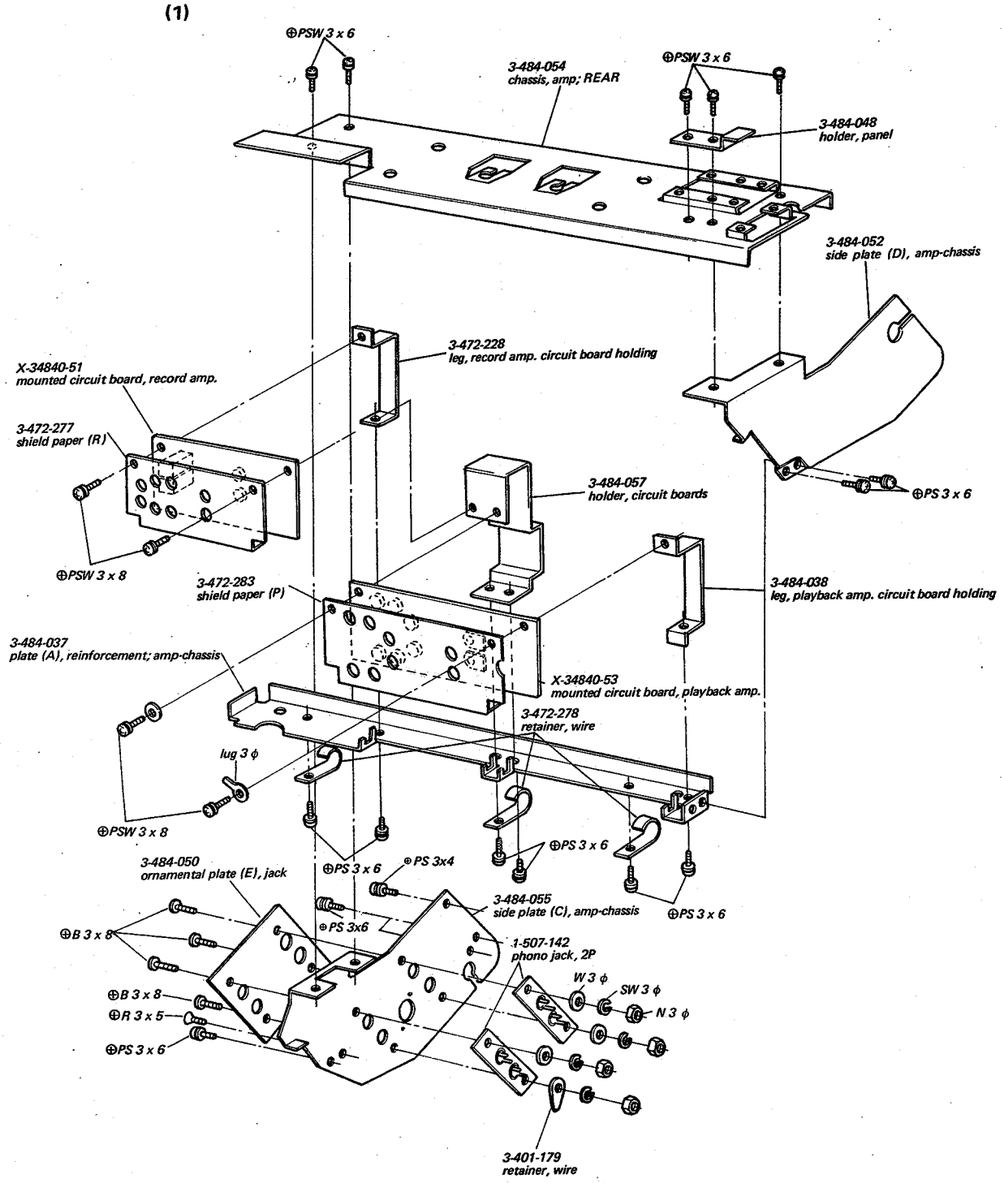
14-3. Amplifier Chassis — FRONT — (1)


⊕PSW 3 x 10
3-472-240-11 02 21 rod, record lever releasing
3-472-244 lever (A), record lever releasing
3-472-262 knob, REC
3-472-207 spring
3-472-243 spacer
3-472-242 lever (B), record lever releasing
⊕PS 2.6 x 6
1-514-041 switch, leaf; bias timing (SS02)
lug 3φ
1-524-062 meter, level
3-472-290 cushion, level meter
supplied with variable resistor
⊕PSW 3 x 6
1-514-655-11 switch, seesaw; POWER
1-231-057 encapsulated component 0.033μ + 120Ω
3-472-224-04 chassis, amp.; FRONT
3-442-022 grommet, lamp
1-518-093-21 lamp
1-222-305 resistor 100 kΩ, variable; AUX
1-222-306 resistor 20 kΩ, variable; MIC
1-514-640 switch, toggle; MONITOR (S102, 302)
3-472-502 cover, power switch
1-514-642 switch, toggle; TAPE SELECTOR (S106, 306)
1-536-181 terminal strip, 2-L-1
⊕PS 3 x 5
3-442-022 grommet, lamp
1-518-093-21 lamp
1-222-306 resistor 20 kΩ, variable; MIC
3-432-155 spring
1-536-180 terminal strip, 1-L-2
3-472-238 lever (B), record
3-472-236 holder, record lever
⊕PS 2 x 4
3-472-246 retainer, record lock levering rod
0-051-251 pad, REC knob
1-222-305 resistor 100 kΩ, variable; AUX
3-451-128 washer, jack insulating
supplied with jack
3-472-234 washer, mini jack insulating
3-472-297 shield paper (A), jack
3-472-233 washer, jack insulating
1-514-641 switch, toggle; NOISE SUPPRESS (S103, 303)
1-507-282 jack, HEADPHONE
3-437-228 washer (B), mini jack
1-507-251 jack, mini; MIC
3-472-239 spring, record switch
3-472-237 lever (A), record
3-472-245 rod, record lever locking
3-426-504 spring
3-465-048 screw (J), step

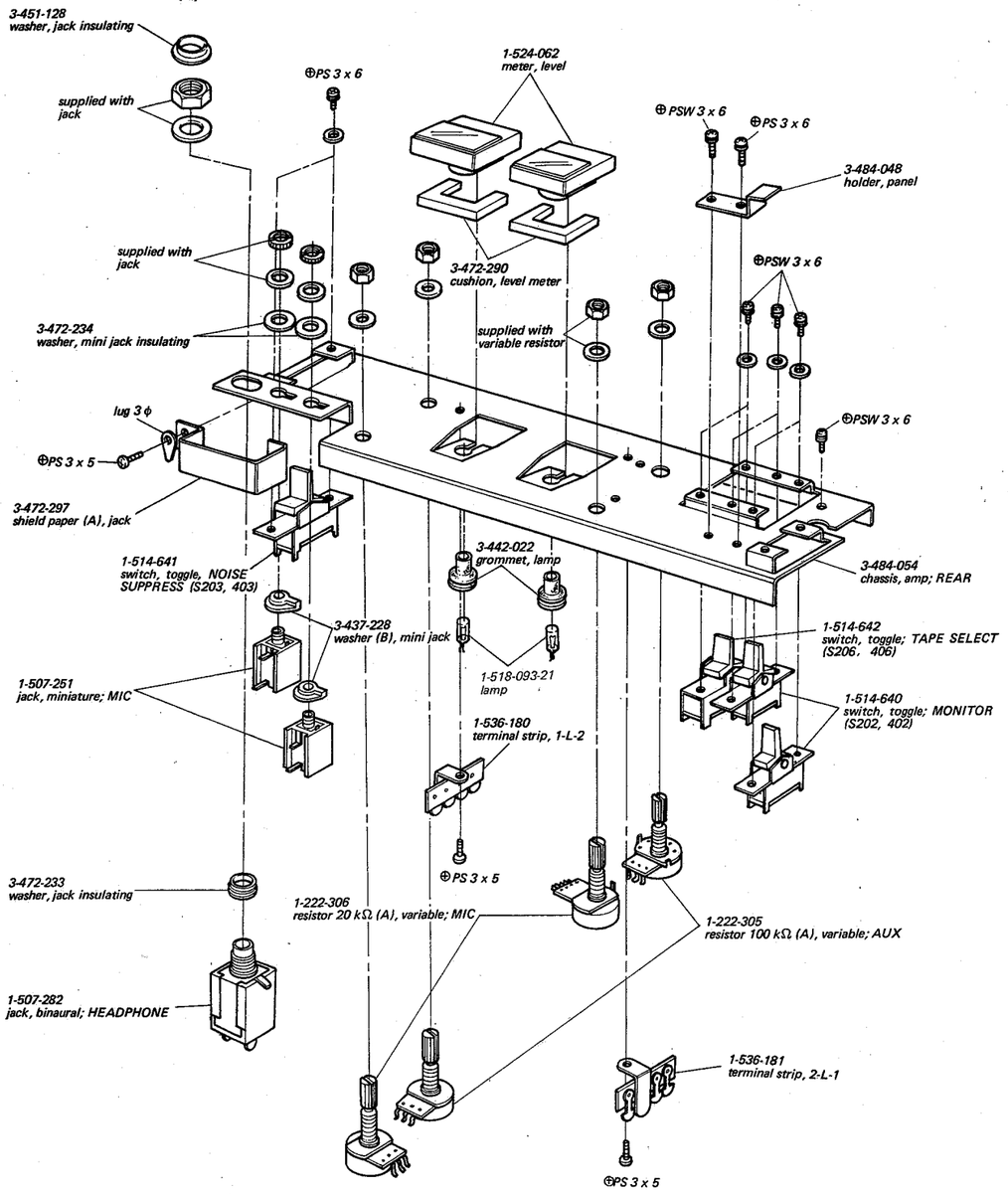
14-4. Amplifier Chassis — FRONT — (2)


3-472-224-04 chassis, amp.; FRONT
3-472-229 leg, bias oscillator circuit board holding
X-34840-54 mounted circuit board, bias oscillator
X-34840-07 shield plate ass'y, bias osc.
3-401-179 retainer, wire
3-419-752 plate, fuse indicating
1-532-069 fuse, 0.8 A
1-533-006 holder, fuse
3-484-221 label, specification
3-410-032 stopper, power cord
1-534-487 cord, power attached to switch
3-472-402 ornamental plate (B), side plate (B)
X-34840-52 mounted circuit board, power supply
3-472-230 leg, power supply circuit board holding
2-825-006 insulator, mylar; transistor
external tooth washer 3 φ
3-472-331 washer
1-509-064 switch, power voltage selector
3-484-049 ornamental plate (D), jack
1-536-146 terminal strip, i-L-1
X-34840-05 side plate (B) ass'y, amp. chassis
3-419-436 cover, fuse terminal
1-507-142 phono jack, 2P
3-484-036 side plate (A), amp-chassis
3-484-057 holder, circuit boards
X-34840-53 mounted circuit board, playback amp.
3-472-263 shield paper (P)
3-472-228 leg, record amp circuit board holding
X-34840-51 mounted circuit board, record amp.
3-472-277 shield paper (R)
3-484-037 plate (A), reinforcement; amp-chassis
3-472-278 retainer, wire
⊕PSW 3 x 6
⊕PS 3 x 6
⊕P 3 x 6
⊕P 4 x 10
⊕B 3 x 8
⊕B 3 x 10
⊕PSW 3 x 8
⊕PS 3 x 8
W 4 φ
W 3 φ
SW 3 φ
N 3 φ
lug 3 φ

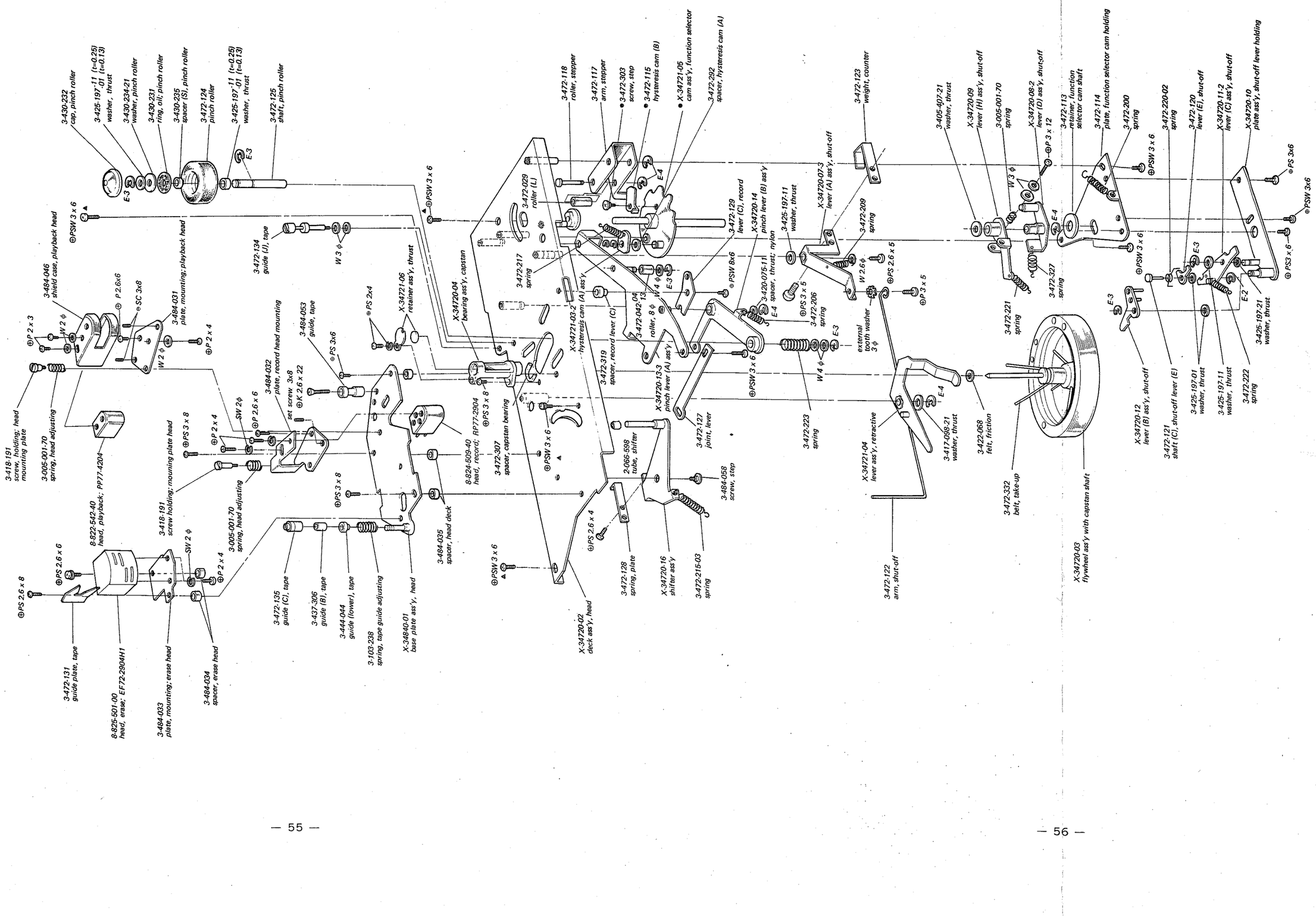
14-5. Amplifier Chassis — REAR — (1)



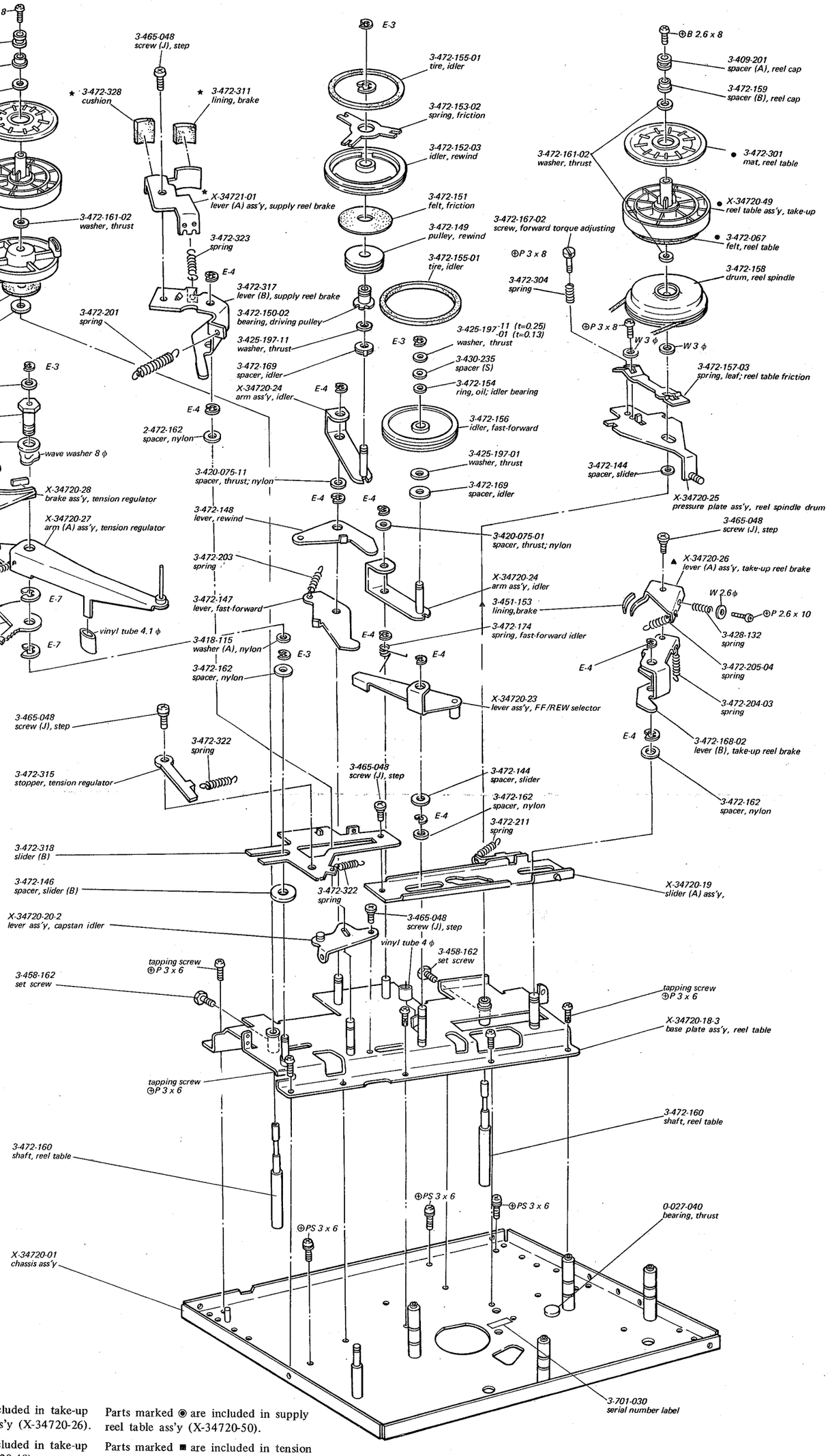
14-6. Amplifier Chassis — REAR — (2)



14-7. Head Deck — top view —



Parts marked ● are included in function selector cam ass'y (X-34721-05).



Parts marked ▲ are included in take-up reel brake lever (A) ass'y (X-34720-26).

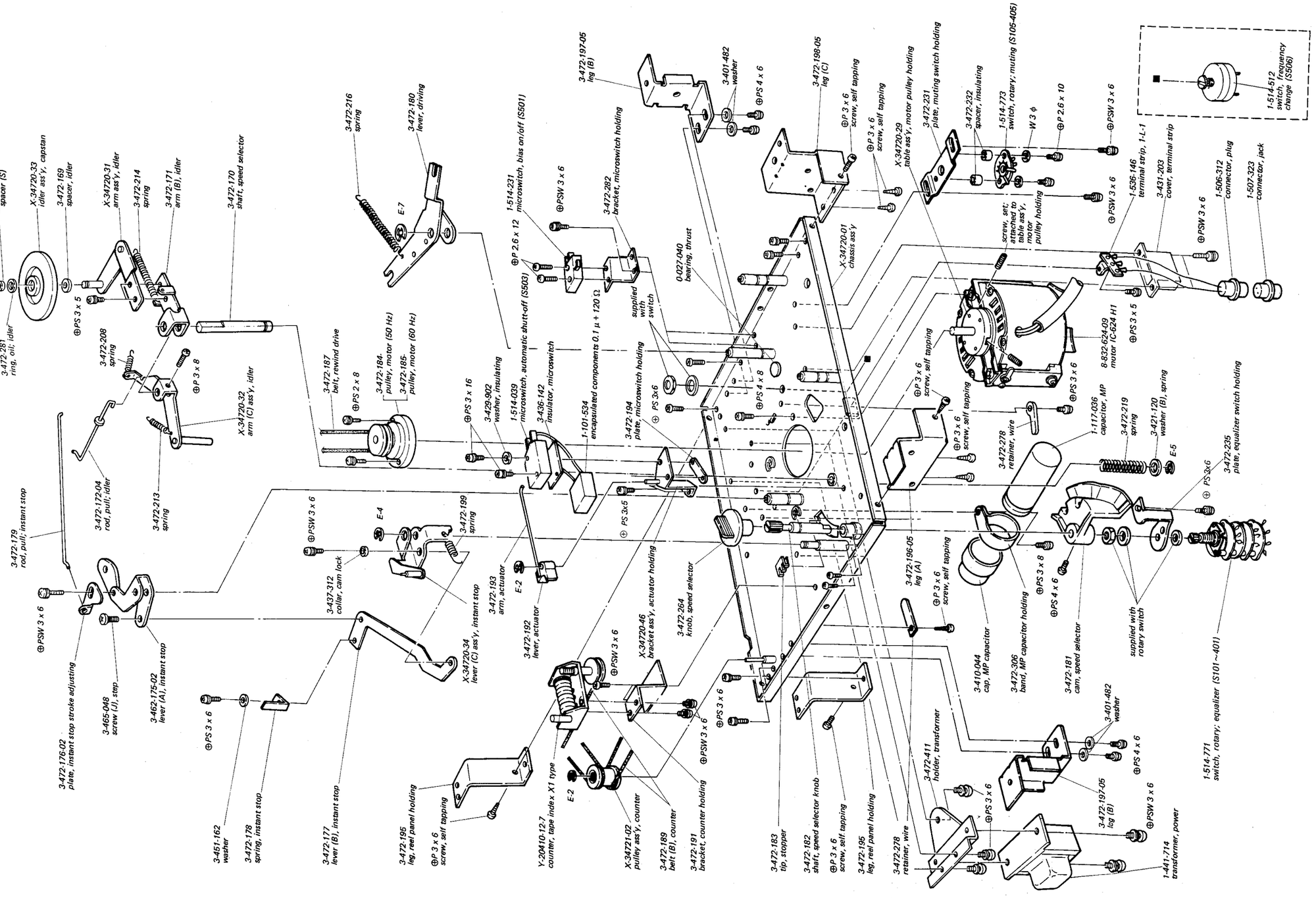
Parts marked ● are included in take-up reel table ass'y (X-34720-49).

Parts marked ★ are included in supply reel brake lever (A) ass'y (X-34721-01).

Parts marked ◉ are included in supply reel table ass'y (X-34720-50).

Parts marked ■ are included in tension regulator arm ass'y (X-34721-07).

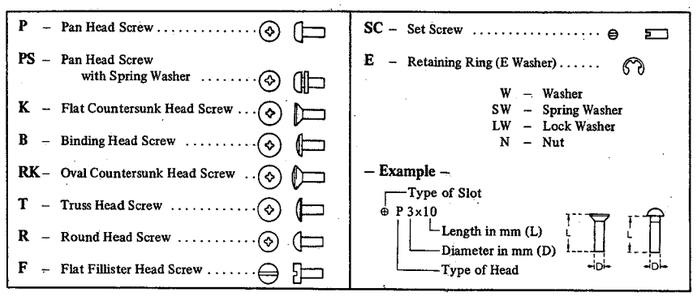
14-9. Mechanical Chassis View



15. HARDWARES

Part No.	Description
	SCREWS
7-621-259-25	⊕ P 2.6 x 4
7-621-259-42	⊕ P 2.6 x 6
7-621-259-52	⊕ P 2.6 x 8
7-621-259-62	⊕ P 2.6 x 10
7-621-259-72	⊕ P 2.6 x 12
7-621-560-32	⊕ K 2.6 x 22
7-621-771-38	⊕ B 2.6 x 8
7-628-253-22	⊕ PS 2.6 x 10, w/spring washer
7-628-253-32	⊕ PS 2.6 x 10, w/spring washer
7-628-254-12	⊕ PS 2.6 x 6, w/spring washer
7-628-254-22	⊕ PS 2.6 x 8, w/spring washer
7-681-124-13	⊕ P 2 x 4
7-682-145-01	⊕ P 3 x 4
7-682-148-01	⊕ P 3 x 8
7-682-149-01	⊕ P 3 x 10
7-682-160-01	⊕ P 4 x 6
7-682-246-01	⊕ K 3 x 5
7-682-348-14	⊕ RK 3 x 8
7-682-351-14	⊕ RK 3 x 14
7-682-352-14	⊕ RK 3 x 16
7-682-366-05	⊕ RK 4 x 20
7-682-372-05	⊕ RK 4 x 50
7-682-548-13	⊕ B 3 x 8
7-682-550-13	⊕ B 3 x 12
7-682-551-14	⊕ B 3 x 14
7-682-562-13	⊕ B 4 x 10
7-682-565-03	⊕ B 4 x 16
7-682-624-00	⊕ PS 2 x 4, w/spring washer
7-682-627-00	⊕ PS 2 x 8, w/spring washer
7-682-646-00	⊕ PS 3 x 5, w/spring washer
7-682-647-00	⊕ PS 3 x 6, w/spring washer
7-682-648-00	⊕ PS 3 x 8, w/spring washer
7-682-652-00	⊕ PS 3 x 16, w/spring washer
7-682-660-00	⊕ PS 4 x 6, w/spring washer
7-682-661-00	⊕ PS 4 x 8, w/spring washer
7-682-947-01	⊕ PSW 3 x 6
7-682-948-01	⊕ PSW 3 x 8
7-683-141-21	⊖ SC 3 x 8
7-683-242-31	3 x 10, lock w/hexagonal
7-683-247-31	4 x 6, lock w/hexagonal
7-685-133-01	⊕ P 2.6 x 6, self tapping
7-685-145-31	⊕ P 3 x 6, self tapping
7-685-146-31	⊕ P 3 x 8, self tapping
7-685-146-01	⊕ P 3 x 8, self tapping
	NUTS
7-622-108-02	N 3φ
7-622-501-06	N 4φ, with claw
	WASHERS
7-623-104-11	W 1.7φ (middle)
7-623-105-22	W 2φ (large)
7-623-107-02	W 2.6φ (small)
7-623-107-22	W 2.6φ (large)
7-623-108-02	W 3φ (small)
7-623-108-12	W 3φ (middle)
7-623-108-18	W 3φ (middle)
7-623-110-02	W 4φ (small)
7-623-110-12	W 4φ (middle)
7-623-113-12	W 6φ
7-623-205-26	SW 2φ
7-623-207-22	SW 2.6φ
7-623-208-22	SW 3φ 8φ, wave
7-623-408-05	LW 3φ (external)
7-623-508-21	LW 3φ
	RETAINING RINGS
7-624-104-01	E-2
7-624-106-01	E-3
7-624-108-01	E-4
7-624-109-01	E-5
7-624-111-01	E-7
7-624-112-01	E-8

— Hardware Nomenclature —


P – Pan Head Screw
PS – Pan Head Screw with Spring Washer
K – Flat Countersunk Head Screw
B – Binding Head Screw
RK – Oval Countersunk Head Screw
T – Truss Head Screw
R – Round Head Screw
F – Flat Fillister Head Screw
SC – Set Screw
E – Retaining Ring (E Washer)
W – Washer
SW – Spring Washer
LW – Lock Washer
N – Nut
– Example –
Type of Slot
⊕ P 3x10
Length in mm (L)
Diameter in mm (D)
Type of Head

16. CONVERSION TO DIFFERENT POWER LINE FREQUENCY

If the deck is to be operated on a line frequency different from the frequency for which the deck is adjusted, it may be easily converted. (Remove the reel panel for access.)

FIRST: Using a screw-driver, turn the line frequency switch (S506) to the correct position for the power to be used (50 or 60 Hz). See Fig. 16-1.

SECOND: Replace the motor pulley as follows:

1. Remove the Instant Stop adjusting plate and withdraw the Instant Stop pull rod.
2. Remove the two screws which hold the motor pulley and take off the pulley of its shaft.
3. Replace the motor pulley with the correct diameter pulley for the line frequency to be used. ALWAYS replace the pulley with the same marking (i.e., "+3") as the one you removed. (This identification mark indicates a fine speed tolerance diameter.)
4. Adjust by positioning the instant stop adjusting plate so that the distance between the end of the pull rod and the instant stop adjusting plate is 4～6 mm (5/32～15/64") in STOP mode as shown in Fig. 16-2.

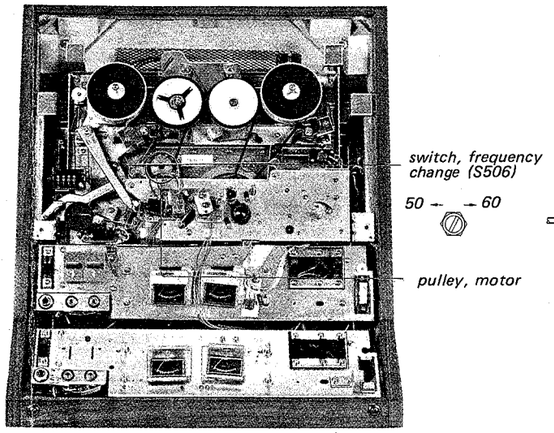


Fig. 16-1

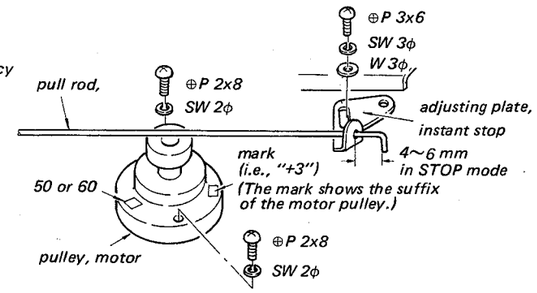


Fig. 16-2

Motor Pulley Part No.			
for 50 Hz		for 60 Hz	
Identification Mark on Motor Pulley	Part No.	Identification Mark on Motor Pulley	Part No.
+3	3-472-184-61	+3	3-472-185-61
+2	3-472-184-51	+2	3-472-185-51
+1	3-472-184-41	+1	3-472-185-41
+0.5	3-472-184-71	+0.5	3-472-185-71
0	3-472-184-01	0	3-472-185-01
-0.5	3-472-184-81	- 0.5	3-472-185-81
-1	3-472-184-11	- 1	3-472-185-11
-2	3-472-184-21	- 2	3-472-185-21
-3	3-472-184-31	- 3	3-472-185-31

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